KEMENTERIAN PENDIDIKAN TINGGI

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Academic Handbook

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SESSION 2017 / 2018

FTMK

FACULTY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

SOARING UPWARDS
MALAYSIAN HIGHER EDUCATION

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ACADEMIC HAND BOOK SESSION 2017/2018

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

©FIRST PUBLISHED 2018
Universiti Teknikal Malaysia Melaka

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Published and Printed in Malaysia

Penerbit Universiti
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Bangunan Perpustakaan Laman Hikmah
Universiti Teknikal Malaysia Melaka
Hang Tuah Jaya
75300, Durian Tunggal, Melaka
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UNIVERSITY'S MANAGEMENT

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DEPUTY VICE CHANCELLOR (RESEARCH & INNOVATION)

ASSOC. PROF. DR. IZAIDIN BIN ABDUL MAJID

DEPUTY VICE CHANCELLOR (STUDENT AFFAIRS)

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UTeM Mission

UTeM determined to lead and contribute to the wellbeing of the country and the world by:
- Promoting Knowledge Through Innovative Teaching & Learning, Research and Technical Scholarship -
- Developing Professional Leaders with Impeccable Moral Values -
- Generating Sustainable Development Through Smart Partnership with the Community and Industry -

UTeM Vision

To Be One of the World's Leading Innovative and Creative Technical Universities.

UTeM Motto

Excellence Through Competency

EDUCATIONAL GOALS

1. To conduct academic and professional programmes based on relevant needs of the industries.
2. To produce graduates with relevant knowledge, technical competency, soft skills, social responsibility and accountability.
3. To cultivate scientific method, critical thinking, creative and innovative problem solving and autonomy in decision making amongst graduates.
4. To foster research development and innovation activities in collaboration with industries for the development of national wealth.
5. To equip graduates with leadership and teamwork skills as well as develop communication and life-long learning skills.
6. To develop technopreneurship and managerial skills amongst graduates.
7. To instil an appreciation of the arts and cultural values and awareness of healthy life styles amongst graduates.

OBJECTIVES

1. To become a creative and innovative learning and knowledge organization that offers practice and application oriented academic programmes in the fields of engineering and technology.
2. To lead in research, development, innovation, commercialization and consultancy activities based on the needs of the industry.
3. To produce competent graduates with high moral values who will be the preferred choice by the industry.
4. To have competent and highly qualified staff with vast practical experiences.
5. To play an effective role as the main impetus to the industrial development of the nation.
6. To establish cooperation and smart partnership between the university and the industries.
7. To provide infrastructure and conducive environment to generate and maintain excellence.
8. To implement comprehensive and extensive usage of ICT in both academic activities and management of the university.

DEAN'S MESSAGE

Assalamualaikum Warahmatullah and Salam Sejahtera.

Alhamdulillah, praise be to the Almighty who have blessed us with the opportunity to publish this FTMK undergraduate programmes' academic guidebook for the session 2017/2018. The main objective of this guidebook is to be the main reference concerning undergraduate curricula in the faculty. This academic guidebook contains all the needed information on the faculty's academic programmes and it serves as a definitive guide on the rules and regulations in pursuing higher education in this university.

I would like to take this opportunity to congratulate all the new students for having been selected by the university to pursue various courses in the Faculty of Information and Communication Technology (FTMK). Since its establishment, FTMK has been instrumental in producing high-skilled professionals who have the knowledge, skills and ability to excel in the Information and Communication Technology (ICT) industry. Faculty members with high academic qualifications, significant industrial experience gained during the course of study, various academic programmes being offered, and state-of-the-art learning infrastructures, have been identified as the main factors for the success.

In line with the Malaysian government's goal to have high-skilled workforce that can catalyse the nation's economy, FTMK has sets its aim to be the country's second best faculty to offer undergraduate programmes and the fifth best faculty to offer postgraduate programmes in the field of ICT by the year 2015. As such, FTMK offers vast opportunities for students to equip themselves with relevant knowledge and skills in ICT.

Finally, on behalf of the faculty, I would like to express my utmost appreciations to the publication committee members and to all who have been involved, either directly or indirectly, in the efforts of publishing this academic guidebook. The faculty sincerely hopes that this publication will help the students to plan their academic endeavour and finally attain academic excellence.

All the Best and welcome to the faculty.

Wassalam.

Professor Dr. Burairah Hussin
Dean
Faculty of Information and Communication Technology
Universiti Teknikal Malaysia Melaka

FTMK AT A GLANCE

Faculty of Information and Communication Technology (FTMK) was one of the earliest formed faculty at Kolej UniversitiTeknikal Malaysia (KUTKM) on the 1st of December 2000. The Faculty started to operate on 22 June 2001 with its pioneer batch of students of academic session 2001/2002. Since 1st February 2007, Kolej Universiti Teknikal Malaysia (KUTKM) is known as Universiti Teknikal Malaysia Melaka (UTeM).

The Faculty established five (5) departments as below:

i. Department of Software Engineering
ii. Department of Computer System & Communication
iii. Department of Interactive Media
iv. Department of Intelligent Computing & Analytics
v. Department of Diploma Studies

Courses offered by the faculty for the academic session 2017/2018 are as follows:

DIPLOMA

i. Diploma in Information and Communication Technology

BACHELOR'S DEGREE

i. Bachelor of Computer Science (Software Development) with Honours
ii. Bachelor of Computer Science (Database Management) with Honours
iii. Bachelor of Computer Science (Interactive Media) with Honours
iv. Bachelor of Computer Science (Computer Networking) with Honours
v. Bachelor of Computer Science (Artificial Intelligence) with Honours
vi. Bachelor of Computer Science (Computer Security) with Honours
vii. Bachelor of Information Technology(Game Technology) with Honours

MASTER'S DEGREE

By research

i. Master in Information and Communication Technology

By coursework

i. Master of Computer Science (Internetworking Technology)
ii. Master of Computer Science (Software Engineering)
iii. Master of Computer Science (Database Technology)
iv. Master of Computer Science (Security Science)
v. Master of Computer Science (Multimedia Computing)

PhD

i. Doctor Of Philosophy in Information and Communication Technology *(by research)*
ii. Doctor of IT

Faculty Vision, Mission and Objectives

FACULTY VISION

To become creative, innovative and world class centre of excellence in the field education, research and services of Information and Communication Technology.

FACULTY MISSION

To develop highly competent professionals with outstanding personalities through a world class technical education on the basis of application oriented teaching, learning and research with smart partnership with industry and university.

FACULTY OBJECTIVES

i. To create ethical, competent and skillful ICT professionals of local, international and industry's choice.

ii. To spearhead and develop applied research in the ICT field to produce new knowledge and innovative technology needed by the industry which can be commercialized and recognized internationally.

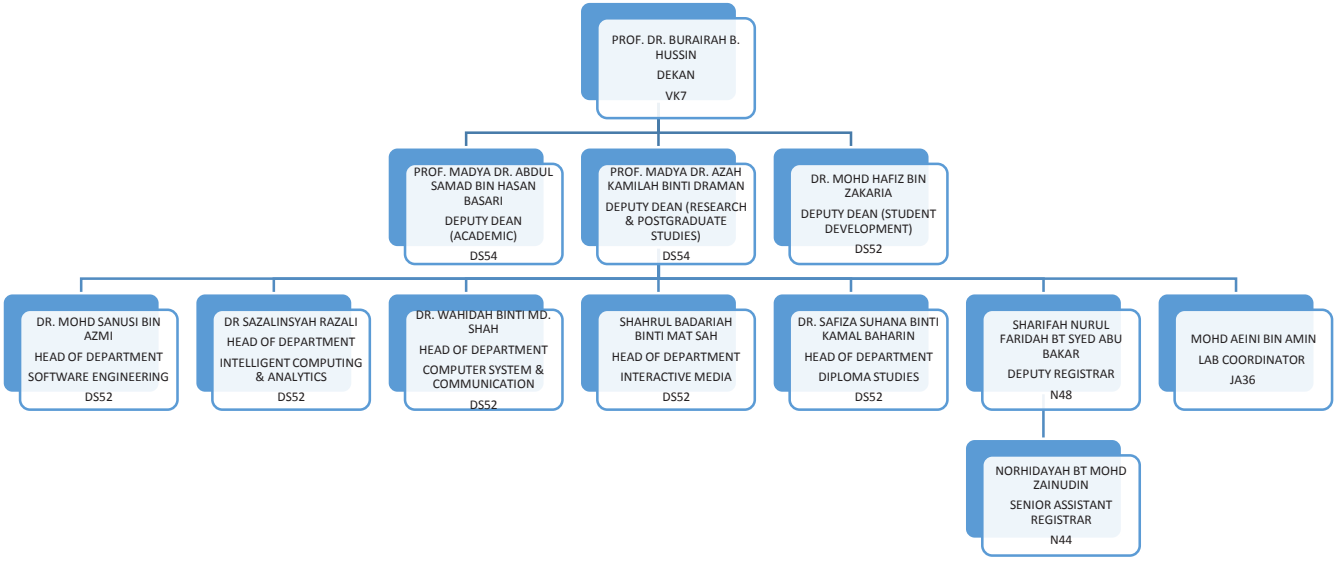
iii. To improve staff professionalism and competence and contribute to university income through consultation, professional training and continuous quality teaching.

iv. To improve ICT understanding, promote ICT culture in the society and provide social services which leads to social well being and economic development.

v. To create continuous smart partnership with local and foreign industry and institutions of excellence.

vi. To develop high quality infrastructure and faculty administration system and support programme development to achieve faculty objectives.

FACULTY MANAGEMENT



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FACILITIES

Lab Facilities

Faculty of Information and Communication Technology (FTMK) has been equipped with the state-of- art computers and software and integrated into UTeM Network. These facilities ease the process of teaching and learning in FTMK.

Averages of 36 computers with latest software are located at each lab and studio to ensure application oriented teaching and learning is applicable for the students. Server, router, switches, wireless, digital camera, video, biometric machines are also provided for teaching and learning purposes.

Lab Staffs

The labs in FTMK are administered by the Head of Lab Manager assisted by Deparments Lab Manager and Assistant Engineer to ensure smooth teaching and learning processes. The infrastructure committee members are responsible for maintaining and managing respective clients in FTMK environment.

Loan Facilities on Lab Equipments

Students are allowed to loan the lab equipments to complete their assignments or projects on time. The equipments that are allowed to be used are wireless equipments, video camera, digital camera, biometric tool, GSM and others.

Lab Operational Hours

Semester

Monday to Thursday	8:00am to 11:00pm
Friday	8:00am to 12:15pm
	2:45 pm to 11:00pm

Semester Break

Monday to Thursday	8:00am to 4:30pm
Friday	8:00am to 12:15pm
	2:45 pm to 4:30pm

Sunday / Public Holidays Close

NAME	PURPOSE
Executive Lab	Short courses, Industry /Professional Certification
Software Engineering Lab 1, 2, 3 and 4	Lab for software engineering
Programming Lab 1, 2 and 3	General programming lab
Database Lab 1, 2 and 3	Lab for database subjects and Oracle certification
Network Lab 1 and 2	Networking lab
CCNA & CCNP Lab	Lab for CCNA & CCNP Certification
Fiber Optic Lab	Lab for fiber optic learning
Security Lab	Lab for security and certification in security
System / Hardware Lab	Lab for subjects related to system and computer equipments
Wireless Lab	Lab for wireless networking studies
Virtual Reality Lab	Lab for virtual reality, graphics and animation
Multimedia Lab 1, 2, 3 and 4	Lab for multimedia applications development
Artificial Intelligence Lab 1, 2 and 3	Lab for Artificial Intelligence, Mathematics and Statistics subjects
Artificial Intelligence Lab 4	Lab for Artificial Intelligence projects and workshops
Student Workshop Lab	Lab for students' group projects and final year projects
Virtual Reality Studio	Lab for motion capture and games development
Photography / Recording Studio	Multimedia recording and editing studio
Research Lab	Seven research lab for post graduates students based on faculty's research clusters

Lab Usage Regulation

1. Students must display their matric card at all times in the lab.
2. Students are not allowed to bring in their bags into the lab.
3. Students are not allowed to eat/drink or bring in any foods or drinks into the lab.
4. Students are not allowed to wear sandals in the lab except sandals with back straps for female students and covered sandals for male students.
5. Students are not allowed to wear t-shirt without collar in the lab. UTeM's students' dress code is referred.
6. All lab equipment used must be returned in its original condition.
7. Chairs must be arranged neatly after use.
8. Don't leave used papers or litters in the lab. Please throw it into rubbish bin if it is not needed anymore.
9. All equipment must be switched off after used.
10. Students should not enter the lab without lecturers'or tutors' presence.
11. For after-hours lab usage, students must record their details in the lab record book and submit their matric card to Assistant Engineers in duty.
12. Students are prohibited from playing games, chatting or surfing the net for unrelated content in the lab.
13. Students are not allowed to bring out any lab equipment except with permission from the lecturers or Assistant Engineers in duty.
14. Students are not allowed to bring in laptop, CPU, monitor, mouse, CD, VCD or any computer equipment except with permission from the lecturers or Assistant Engineers in duty.
15. Users are not allowed to do any installation on computers in the lab.
16. All requests for software installation into students'laptop will not be entertained.
17. Students must report immediately to lecturer or Assistant Engineers in duty if any lab equipment got lost or broken during their students' usage.
18. Students must report immediately to lecturer or Assistant Engineers in duty if there is any lab equipment that is lost or broken prior to the students' usage.
19. Research labs are for post graduates students ONLY. Post-graduate students can get the access by referring to their supervisor.

Lab Rules outside P&P Allocated Times

1. Total users for a lab must comply with the maximum capacity allowed for a particular lab.
2. Students are allowed to use labs outside P&P allocated times with permission from a lecturer. The lecturer will be responsible for lab for the duration of the usage. Students must record their start and end time of usage in the record book provided in the lab.
3. Studios and Recording room usage are strictly by booking only. Students can use the studios or recording room through their lecturer or AssistantEngineer in duty.

DISCIPLINARY ACTION WILL BE TAKEN AGAINST ANY STUDENT WHO IS FOUND BREAKING ANY RULE LISTED ABOVE.

PROGRAM EDUCATION OBJECTIVES (PEO)

Program Educational Objectives are broad statements that describe quality that are supposed to be acquired by the graduates upon graduation and after a few years of employment.

PROGRAM EDUCATION OBJECTIVES FOR BACHELOR OF COMPUTER SCIENCE

The following are the PEO for Bachelor of Science in:

1. Software Development
2. Database Management
3. Interactive Media
4. Computer Networking
5. Artificial Intelligence
6. Computer Security

PEO1 Practice broad knowledge and skills in Computer Science and specialist knowledge in the above program to solve relevant ICT problems.

PEO2 Demonstrate business acumen and thinking skills by engaging life-long learning through postgraduate education and/or continuous professional development.

PEO3 Demonstrate effective communication and technical leadership through involvement in various ICT projects, consultation and entrepreneurial activities

PEO4 Demonstrate moral and professional commitment for the betterment of the society.

PROGRAM EDUCATION OBJECTIVES FOR BACHELOR OF INFORMATION TECHNOLOGY (GAME TECHNOLOGY)

PEO1 Practice broad knowledge and skills in IT and specialist knowledge in game technology to solve problems through gamification.

PEO2 Lead in game industry through innovation and continuous professional development.

PEO3 Demonstrate effective communication and technical leadership through involvement in various ICT projects, consultation and entrepreneurial activities.

PEO4 Demonstrate moral and professional commitment for the betterment of the society.

PROGRAM EDUCATION OBJECTIVES FOR DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

PEO1 Practice technical knowledge and skills of Information and Communication Technology (ICT) and lead a team of programmers or ICT technicians.

PEO2 Pursue life-long learning and continuous education at bachelor degree or in ICT professional development.

PEO3 Demonstrate effective communicate verbally and written technical solutions in project team and end user.

PEO4 Demonstrate ethical behaviors and interpersonal skills in ICT profession.

Program Educational Objectives are broad statements that describe quality that are supposed to be acquired by the graduates upon graduation and after few years of employment.

i. Have strong knowledge of sciences, engineering and technology in their profession.

ii. Attain knowledge of contemporary issues in technology through research and life-long learning activities.

iii. Ability to function as an effective team player with the capability to lead and appreciate team work and leadership qualities.

iv. Appreciate and uphold professional attitudes and ethics necessary in fulfilling their responsibilities towards the Almighty, clients and the society.

LIST OF DEPARTMENTS

Currently, Faculty of Information and Communication Technology has five (5) departments offering Bachelor Degree and Diploma programmes as follows:

DEPARTMENT OF SOFTWARE ENGINEERING

Software Engineering is a field of knowledge about computer software development using structured methods, techniques and schemes. In line with this, the Department of Software Engineering offers two bachelor programmes of Computer Science namely Software Development and Database Management. This department plays a major role in producing competent and professional software engineers to design and develop highly sophisticated and complex applications including Intelligent Systems.

Our programmes have been designed carefully to produce professionals in software engineering with a combination of various technical aspects, soft skills and ethics. The graduates are expected to understand the users, software and system requirements, competent in applying emerging software technologies design, manage, perform testing, maintain and develop the system with software engineering methodology. We also ensure that our graduates are equipped with project management skills, work ethics, risk management knowledge and the importance of team work in software development processes.

The objective of specialization in Database Management is to produce skilled professionals in Database Management. The course equips the graduates with various skills such as database analysis, design and development based on the system specifications. The students will also be exposed to data warehouse and data mining techniques. Application oriented approach could also produce highly competitive and creative software engineers in the job market.

DEPARTMENT OF INTERACTIVE MEDIA

The Department of Interactive Media offers undergraduate and graduate programmes in the area of multimedia. In addition to the basic courses in ICT, the programmes offered by this department focus on the concept of interactivity in the design and development of high quality multimedia products and web sites. This also includes applying the knowledge of interactivity in the area of computer graphics, animation, digital audio video technology, virtual reality and computer games development. With the emphasis on training and hands-on approach, we believe that the graduates are able to fulfill the job markets in the field of multimedia.

DEPARTMENT OF COMPUTER SYSTEMS & COMMUNICATION

The continuous revolution in information and communication technology has changed the composition of human resource and human capital nowadays. The needs of ICT to date caused a vast demand for ICT workers that will allow the use of existing technologies in developing the future technologies. The demands of ICT workers

including hardware engineers, software engineers, system analyst, computer programmer, network and system security officer, multimedia specialist and technical support personnel have been increased since the establishment of Multimedia Super Corridor (MSC).

In order to fulfill these demands, the Department of Computer System and Communication was established in 2001. It is a great effort in fulfilling the demand of ICT workers that have expertise, creativity, high skill and knowledge in ICT. To ensure these demands of ICT workers is adequate and equipped with high skills, this department has introduced and implemented the concept of application oriented practices. The results of implementing this concept have produced graduates that are well prepared to face the real life working environment as they have become the experts in their own field.

In addition, throughout this program, students are prepared with the basic information technology subjects and they are exposed to advanced subjects that comprise of planning, developing and designing computer systems, computer networks and computer security. They are also introduced to the resource sharing Methods, computer system management, hardware troubleshooting, network software and others.

DEPARTMENT OF INTELLIGENT COMPUTING & ANALYTICS

Malaysia's vision to become a developed country by 2020 must to be supported by knowledge content in advanced industrial technology. A higher automation rate can reduce labour force utilisation and ultimately increases productivity. Utilisation of information technology has been proven able to boost industrial development. Therefore, the country needs experienced and competent manpower to apply information technology knowledge and skills in the industrial sectors. The Department of Intelligent Computing & Analytics is established to fulfill such aspiration by focusing on ICT applications in selected industries particularly manufacturing, business, health and tourism.

DEPARTMENT OF DIPLOMA STUDIES

Department of Diploma Studies is aimed to produce trained students in the field of computer technology and commercial computer application to meet the high demands from the government and private sectors. The programme is intended to produce students with knowledge in computer applications and programming. The students will also obtain professional certification as CCNA.

STUDY DURATION

All the Bachelor programmes takes a minimum of 3 ½ year to a maximum of 5 ½ years to complete and the Diploma programme takes a minimum of 3 years and a maximum of 5 years to complete. All programmes are offered on full time basis only.

PROFESSIONAL CERTIFICATION

FTMK is also offering preparation courses for professional certification to produce highly competent professional in the field of Information Technology. The professional courses offered are as follows:

1. Microsoft Certified Application Developer (MCAD)
2. Oracle Certified Professional (OCP)
3. Cisco Certified Network Associate (CCNA)
4. Adobe Certified Expert (ACE)
5. Red Hat Certified Technician (RHCT)
6. SUN Certified Solaris System Administrator
7. SUN Certified Java Programmer

ACADEMIC SYSTEM

The university has implemented its academic system according to semester system. The semester system is widely used in local higher learning institutions in Malaysia. This Academic System Guidelines explains the implementation of Academic Methods and Rules of the University.

- **Academic Year**

SEMESTER I	**Week(s)**		
Lectures	**7**		
Mid Semester Break	**1**		
Lectures	**7**		
Revision Week	**1**		
Final Examination	**2**		
Total	**18**		
Semester Break	**3**		
SEMESTER II			
Lectures	**7**		
Mid Semester Break	**1**		
Lectures	**7**		
Revision Week	**1**		
Final Examination	**2**	**OR**	**Week(s)**
		Semester Break	**1**
Total	**18**		
Semester Break	**13**	**SPECIAL SEMESTER**	
		Lectures & Examination	**8**
		Semester Break	**4**
TOTAL	**52**		**52**

Student's achievement in subjects taken is shown by grades. The Relationship between marks, grades and evaluation points is shown in the following table.

- **The Relationship Between Grade And Point Value**

Marks	Grade	Point Value	Status
80 - 100	A	4.0	Excellent
75 - 79	A-	3.7	Excellent
70 - 74	B+	3.3	Very Good
65 - 69	B	3.0	Very Good
60 - 64	B-	2.7	Very Good
55 - 59	C+	2.3	Pass
50 - 54	C	2.0	Pass
47 - 49	C-	1.7	Marginal Pass
44 - 46	D+	1.3	Marginal Pass
40 - 43	D	1.0	Marginal Pass
00 - 39	E	0.0	Fail

ACADEMIC STANDING

A student's performance is assessed using both GPA and CGPA. A student's academic standing is determined at the end of every regular semester based on his/her CGPA as depicted below.

- **Academic Standing**

Standing	CGPA
Good (KB)	CGPA ≥ 2.00
Conditional (KS)	1.70 ≤ CGPA < 2.00
Fail (KG)	CGPA < 1.70

A student's performance is assessed using Grade Point Average, GPA for each semester and Cumulative Grade Point Average, CGPA at the end of every regular semester for the overall semester performance. A student's academic standing is determined at the end of every regular semester based on his/her CGPA.

a. GPA
GPA is average points obtained by students at the end of each semester. It is counted as below:

$$GPA = \frac{JMN}{JKK} = \frac{k_1 m_1 + k_2 m_2 + .. + k_n m_n}{k_1 + k_2 + .. + k_n}$$

Total Point Value, $JMN = k_1 m_1 + k_2 m_2 + .. + k_n m_n$

Total Credit Count, $JKK = k_1 + k_2 + .. + k_n$

With k_n=Credits for subject **n;** m_n=Point value obtained for subject **n**.

b. CGPA
CGPA refers to cumulative grade point average obtained for all semester studied. It is calculated as below:

$$CGPA = \frac{JMN_1 + JMN_2 + .. + JMN_n}{JKK_1 + JKK_2 + \ldots + JKK_n}$$

With JMN_n= Total point value obtained in semester **n;** JKK_n= Total credit calculated in semester **n**

DEAN's LIST AWARD

A student who obtains a GPA of 3.50 and above will be awarded a Dean's List certificate. The list will be published at University notice board and web page. Students' transcripts will carry the Dean's List award notation.

CONFERRAL OF DEGREES

Degree conferral is endorsed in the two regular semesters. Students are only eligible for the conferral of their diploma or degree after meeting the following requirements:

i. Obtain a Good Academic Standing (KB).
ii. Pass all the required subjects.
iii. Have applied for a degree conferral and have received the Faculty's approval
v. Fulfill other requirements set by the University.

BACHELOR OF COMPUTER SCIENCE (SOFTWARE DEVELOPMENT) WITH HONOURS

COURSE LEARNING OUTCOMES

The Bachelor in Computer Science (Software Development) degree course is offered in order to produce knowledgeable and highly skilled graduates in the field of information technology and communication. Graduates pursuing the program are equipped with the necessary knowledge and specialized skills in engineering and software development which could meet the industrial needs in the field. This includes the ability to analyze, synthesize, design complex systems, maintain, test, control software quality and manage software projects.

LEARNING OUTCOMES

Bachelor of Computer Science (Software Development) programme at FTMK intended to produce graduates with the following characteristic:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to perform system coding using relevant programming language according to industry need.
iv. Able to manage software development project by applying software engineering concepts.
v. Able to perform research in software engineering field.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurshipship skills.
ix. Able to perform continuous self learning to obtain knowledge and skills.

CAREER PROSPECTS

Graduates specialized in Software Engineering have the opportunity to work either in the Government or private sector. They could work as Information System Officer, System Analyst, Software Engineer, Software development Manager, Team member Software Quality Assurance, System Analyst, System Administrator, Software Tester or Software Development Consultant. Graduates have the opportunity too to further up their studies in Master and Doctorate level.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Software Development) degree. The programme consists of components as follows:

Components	Credit Hours
University Compulsory Subjects	18
Programme Core Subjects	66
Course Core Subjects	24
Elective Subjects	12
TOTAL	**120**

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations – TITAS
BLHW 2712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English for Professional Communication
**BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (66 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITP 1113	Programming Technique
BITP 1123	Data Structure and Algorithm
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITP 3113	Object Oriented Programming
BITP 2213	Software Engineering
BITS 1123	Computer Organization and Architecture
BITS 1213	Operating System

BITS 1313	Data Communication and Networking
BITI 1113	Artificial Intelligence
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II
BITP 1213	System Development

COURSE CORE SUBJECTS (24 Credits)

BITM 1113	Multimedia System
BITP 2223	Software Requirement and Design
BITP 3423	Special Topic in Software Engineering
BITP 2313	Database Design
BITP 3253	Software Verification and Validation
BITP 3223	Software Project Management
BITP 3123	Distributed Application Development
BITS 3423	Information Technology Security

ELECTIVE SUBJECTS (12 credits)
Choose any 4 (FOUR) from the following.

BITP 2113	Algorithm Analysis
BITP 2323	Database Administration
BITP 3233	Strategic Information System Planning
BITP 3453	Mobile Application Development
BITP 3443	Formal Methods
BITM 1123	Interactive Media Authoring
BITM 2113	Web Application Development
BITS 2313	Local Area Network
BITS 2513	Internet Technology
BITP 3443	Enterprise Application Development
BITP 3133	Advanced Java Programming
BITI 2213	Knowledge Based Systems
BITM3413	Geographical Information System

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum I **	0	3	1	
BLHL ----	Third Language	1	2	2	
BITI 1213	Linear Algebra And Discrete Mathematics	2	0	2	
BITS 1123	Computer Organization and Architecture	2	2	3	
BITP 1113	Programming Technique	2	2	3	
BITM 1113	Multimedia System	2	2	3	
Total				15	

Note: International Student Only. BLHL 1012 Bahasa Melayu Komunikasi.

Year One (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum II **	0	3	1	
BLHW 2712	Ethnic Relations	2	0	2	**This subject can be
BLHW 1702	Islamic and Asian Civilizations	2	0	2	taken in any semester.
BITI 1223	Calculus and Numerical Methods	2	2	3	Please refer to co
BITP 1323	Database	2	2	3	curriculum
BITP 2213	Software Engineering	2	2	3	unit before registered.
BITP 1123	Data Structure and Algorithm	2	2	3	BITP 1113
Total				17	

Note: International Student Only. BLHW 1942 Malaysian Studies.

Year Two (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITI 2233	Statistics and Probability	2	2	3	
BITS 1213	Operating System	2	2	3	
BLHC 4032	Critical and Creative Thinking	2	0	2	
BITU 2913	Workshop I	0	9	3	BITP 1113
BITM 2313	Human Computer Interaction	2	2	3	
BITP 2313	Database Design	2	2	3	BITP 1323
BITP 2113	Algorithm Analysis	2	2	3	BITP 1113
Total				20	

Note: International Student Only. BLHW 2752 Malaysian Culture.

Year Two (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 2403	Technical English	3	0	3	MUET >= 3
BITI 1113	Artificial Intelligence	2	2	3	
BITI 2223	Software Requirement and Design	2	2	3	
BITP 3253	Software Verification and Validation	2	2	3	BITP 2213
BITS 1313	Data Communication & Networking	2	2	3	
BITP 3113	Object Oriented Programming	2	2	3	
Total				18	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.

Year Three (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English for Profesional Communications	3	0	3	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITP 3123	Distributed Application Development	2	2	3	
BITP 3223	Software Project Management	2	2	3	
BITS 3423	Information Technology Security	2	2	3	
BIT- ----	Elective I	2	2	3	
Total				18	

Year Three (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BTMW 4012	Technology Entrepreneurship	2	0	2	
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BITP 3423	Special Topic in Software Engineering	2	2	3	BITP 2213
BIT- ----	Elective II	2	2	3	
BIT- ----	Elective III	2	2	3	
BIT- ----	Elective IV	2	2	3	
Total				17	

*Equivalent to 25 hours of Self-Learning Time

Year Three (Special Semester)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
Total				3	

*Equivalent to 25 hours of Self-Learning Time

Year Four (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	BITU 3983
BITU 3946	Industrial Training Report	0	24	6	BITU 3983
Total				12	

Note: Pre requisite (completed all subject + MUET Band 2)

Elective Subjects

Below is a list of elective subjects can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subject given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITP 2323	Database Administration	2	2	3	BITP 1323
BITP 3233	Strategic Information System Planning	2	2	3	
BITP 3433	Mobile Application Development	2	2	3	
BITP 3443	Formal Methods	2	2	3	
BITM 1123	Interactive Media Authoring	2	2	3	
BITM 2113	Web Application Development	2	2	3	
BITS 2313	Local Area Network	2	2	3	
BITS 2513	Internet Technology	2	2	3	

List of elective subjects offered will be modified from time to time in accordance with industry needs.

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
B L HL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completion this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Discrete Mathematics. Topics for Linear Algebra include linear equations, matrices, and determinants, vectors in $\boldsymbol{R^n}$, real vector spaces, eigenvalues, linear transformation, and introduction to linear programming. Topics for discrete mathematics consist of logics, sets, function, algorithms, integers, mathematical reasoning, counting, relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus and Numerical Methods (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems

Synopsis

This course covers two areas of mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part topics consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References

1. Atkinson, K. and Han, W., 2004. *Elementary Numerical Analysis, 3rd* Ed., New York: John Wiley & Sons.
2. Atkinson, K., Han, W. Stewart, D.E., 2009. *Numerical Solution of Ordinary Differential Equations*., New Jersey: John Wiley & Sons.
3. Faires, J.D. and Burden, R.L., 2011. *Numerical Analysis*, 9th Ed., Boston: Brooks/Cole.
4. Fowler, J. and Snapp, B., 2014. *MOOculus Calculus* [online] Available at: https://mooculus.osu.edu [Accessed on 28 January 2015].
5. Heinbockel, J.H., 2012. *Introduction to Calculus* [online] Available at www.math.odu.edu/~jhh/Volume-1.PDF [Accessed on 28 January 2015].
6. Varberg,D., Purcell, E. J., and Rigdon,S.E., 2007. *Calculus,* 9th Ed., New Jersey: Pearson Education.

BITI2233 STATISTICS AND PROBABILITY (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate understanding of the concept and fundamentals of statistics and probability.
2. Reproduce solutions for application problems using statistical software.
3. Solve application problems using appropriate statistical techniques.

Synopsis

This course will provide a comprehensive introduction to statistics and probability for computer science students. Topics that will be covered in this course includes data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distribution. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing, estimation and hypothesis testing for two populations, simple linear regression and correlation, and one-way ANOVA. In this course, students are guided to use statistical software to perform descriptive and inferential statistics analysis

References

1. Navidi, W., (2014), "Statistics for Engineers and Scientists", 4th Edition,McGraw-Hill Education.
2. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), "Probability and Statistics for Engineers & Scientist", 9th Edition, Pearson Educational International.
3. Devore, J. L., (2011) "Probability and Statistics for Engineering and the Sciences", 8th Edition, Thomson.
4. Montgomery, D. C., Runger, G. C.,(2011), "Applied Statistics and Probability for Engineers", 3rd Edition, John Wiley.
5. Johnson, R., Freund, J., Miller, I., (2011), "Probability and Statistics for Engineers, 8th Edition", Pearson Educational International.
6. Mann, P. S., (2013), "Introductory Statistics", 8th Edition, Wiley.
7. Sh. Sara, Hanissah, Fauziah, Nortazi, Farah Shahnaz (2008), "Introduction to Statistics & Probability A Study Guide", Pearson Educational International.

BITP 1113 Programming Technique (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications.
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.
2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.
3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.
4. Liang, Y. D. (2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.

5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

BITP 1123 Data Structure and Algorithm (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation.
2. Apply the suitable data structures for an application that requires data structures.
3. Construct the data structures and algorithms in problem solving.

Synopsis

This course introduces the students to data structures and algorithms. The basic concepts in structure, class, array and pointer are discussed in order to understand the fundamental of data structures and algorithms. The course focuses on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics cover the algorithms. This also includes the algorithm efficiency for run time. Pseudo code and C++ programming language will be used in algorithm implementation. Apart from the theory, the students are asked to apply the data structures and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "C++ Programming: Program Design Including Data Structures". 7th, edition, Cengage Learning, 2014.

2. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++", 4thEdition, Addison Wesley, 2011.

3. Michael T. Goodrich, Roberto Tamassia& David M. Mount,"Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.

4. Goodrich, M. T., Tamassia, R. and Mount, D. M. (2011).Data structures and algorithms in C++.2nd edition, Hoboken, NJ, Wiley.

5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITM 2313 Human Computer Interaction (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Julie A. Jacko Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, Third Edition (Human Factors and Ergonomics), CRC Press 2012.

2. Ben Shneiderman et al, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition), 2009.

3. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (2nd Edition), John Wiley & Sons, 2007.
4. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.

BITP 1323 Database (3, 2, 2)

Learning Outcomes

1. At the end of the lesson, students should be able to:
2. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA).
3. Construct a relational database according to user requirements.
4. Solve simple and complex queries using Structured Query Language.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.
2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.
3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.
4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 3113 Object Oriented Programming (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the Relationsship among classes.
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.
3. Perform implementation of classes and Methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs.

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures, GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop a complete Java applications with database.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.
2. Deitel, H. M. & Deitel, P. J., Java How To Program,10th Ed., Pearson Education International, 2014.
3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.
4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.

5. Cadenhead, Rogers, Java in 24 Hours, Sams Teach Yourself (Covering Java 8) (7th Edition), SAMS, 2014.

6. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015

BITP 2213 Software Engineering (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Apply the concept of software engineering for system development.
2. Explain the principles and practices of software engineering in the system development.
3. Follow the standard guideline to produce formal specifications and software modeling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Sommerville, I., 2011, Software Engineering, 9th Edition, Addison-Wesley.

2. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.

3. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.

4. Chemuturi, M. And Caghley, T. M. J., 2010, Mastering Software Project Management: Best

5. Practices, Tools and Techniques, J. Ross Publishing.

6. Bruegge, B. and Dutoit, A. H., 2010, Object-oriented Software Enginering: Using UML, patterns and Java, Prentice Hall

BITS 1123 Computer Organization and Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input / Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.

2. Deitel, H. M. & Deitel, P. J., Java How To Program,10th Ed., Pearson Education International, 2014.

3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.

4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.

5. Cadenhead, Rogers, Java in 24 Hours, Sams Teach Yourself (Covering Java 8) (7th Edition), SAMS, 2014.

6. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015

BITS 1213 Operating System (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts, theory and technology used in operating system.
2. Demonstrate the major components and functionalities of an operating system.
3. Display the basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.

2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed. Addison-Wesley.

3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.

4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.

5. Md Shah, W., Anawar, S., and Zakaria, NA., (2016). Ubuntu: Guide for Basic Administration, Module 23, Penerbit Universiti, UTeM.

6. www.ubuntu.com

BITS 1313 Data Communication and Networking (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Build the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Manipulate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understands the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and apply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring basic computer networks using guided or unguided media.

References

1. Forouzan, Behrouz A., 2012. *Data Communications and Networking*, 5th Edition, McGraw-Hill.

2. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. *Lab Companion: Data Communications and Networking*, 1st Edition.

3. William Stallings, 2013. *Data and Computer Communications*, 10th Edition, Pearson.

4. Massoud Moussavi, 2011. *Data Communication and Networking: A Practical Approach*, 1st Edition, Cengage Learning.

5. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, *Business Data Communications and Networking*, 12th Edition, Pearson

6. Bahaman, Nazrulazhar, Hamid, Erman and Mat Ariff, Azman, 2013. *Data Communications and Networking: Practical Approach*, 3rd Edition, Venton.

7. Curt M. White, 2012. Data Communications and Computer Networks, Cengage Learning

8. Randall J. Boyle, Jeffrey A. Clements, 2013. *Applied Networking Labs,* 2nd Edition, Prentice Hall

BITM 1113 Multimedia System (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Interpret the core concept of multimedia elements (C2, P1).
2. Construct multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs (C3, LL2).
3. Demonstrate problem solving skills for multimedia project development (P2, A1, and CTPS1).

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D/3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communcation skills while performing their various tasks and project. Cooperative Learning (CL), Problem Based Learning (PBL), Cooperative Learning and Collaborative Learning approach will be used to enhance student's capability such as competency, attitude, knowledge and communication skills.

References

1. Norasiken, B., Huoy, C. Y., Mohamad Lutfi, D., Farah, N. A. & Ahmad, N. C. P., (2014), Multimedia System, University Technical Malaysia Melaka, Module.

2. Vaughan, T., (2014), Multimedia: Making It Work 8th Edition (Ninth Edition), McGraw-Hill Osborne Media.

3. Philips, R., (2013), The Developer's Handbook to Interactive Multimedia, Routledge – Taylors & Francis Group.

4. Burg, J., (2009), the Science of Digital Media, Prentice Hall.

5. Li, Z., Drew, M. S., and Liu, J., (2014) Fundamental of Multimedia (Second Edition), Springer.

BITI 1113 Artificial Intelligence (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the definition of Artificial Intelligence and its techniques.
2. Classify the types of Artificial Intelligence techniques.
3. Follow the Artificial Intelligence techniques in problem solving.

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References

1. Russel, S & Norvig, P. (2010). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
2. Luger, G. F. (2015). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Pearson Education.
3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, and Addison Wesley.
4. Kopec, D, Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

BITU 2913 Workshop I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually.
2. Identify and solve problems in systematic way.
3. Defend while presenting result of the project.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.
2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son, 2012.
3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.
4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.
5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives.
2. Practise the knowledge and skills that they have learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.
4. Report technical tasks performed into a technical journal.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Report on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review.
2. Develop project using an appropriate method.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the

final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline2015", FTMK, UniversitiTeknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, UniversitiTeknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, UniversitiTeknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3, 0, 25)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has potential commercial value.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline2015", FTMK, UniversitiTeknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, UniversitiTeknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, UniversitiTeknikal Malaysia Melaka.

COURSE CORE SUBJECTS

BITP 2223 Software Requirement and Design (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Analyze software requirement and design the software using object oriented approach and UML.
2. Model software analysis, software requirement and software design using object oriented approach supported by case tool, StarUML.
3. Identify and solve common design problem using Design Pattern concept.

Synopsis

This course introduces the student to the object oriented approach using UML such as object-oriented concept, object oriented application development life cycle, UML history and

notation, comparison between OOAD and SDM and introduction to object and class. This course includes the use-case model to capture the requirement using use case diagram and use case description. They will learn to identify the uses cases, actors, perform analysis modeling sing dynamic or static diagram such as activity diagram, sequence diagram, collaboration diagram and class diagram.

References

1. Karl Wiegers, Joy Beatty, Software Requirements, Third Edition, Microsoft, 2014.

2. Alan Dennis, Barbara Haley Wixom and David Tegarden, System Analysis and Design with UML: An Object-Oriented approach 3rd Edition, Wiley 2010

3. Mohd Khanapi Abd Ghani, and Sufian Sulaiman, Lab Module - Software Requirement Analysis and Design: Object-oriented approach with UML.Penerbit UTeM, 2011

4. Martin Fowler, UML Distilled Third Edition A Brief Guide to the Standard Object Modeling Language, Addison Wesley 2012

5. Ian Sommerville, Software Engineering 6th Edition, Addison Wesley 2012

6. Cay Horstman, Object Oriented Design and Patterns, John Wiley and Sons 2012

7. Alan Shalloway, James Trott Design Patterns Explained: A New Perspective on Object-Oriented Design, 2/E, Addison-Wesley Professional, 2012

8. Jim Arlow, Ila Neustadt UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2/E, Addison-Wesley Professional, 2012

BITP 3423 Special Topic in Software Engineering (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Increase understanding and knowledge on specific business domain that could be used for future research.
2. Increase skills in analyzing and designing critical application system.
3. Produce high quality knowledge base application.

Synopsis

This course will focus on and expose students to specific business domain that students can understand the field better. Specific fields are selected depending on the needs and current trends. The fields might include finance and accounting, human resources, e-healthcare, e-education, e-commerce, e-government, manufacturing, customer service, and so on.

References

1. Lankhorst, M., Enterprise Architecture at Work: Modelling, Communication and Analysis, Springer, 2013.

2. Hausman, K. K., Cook, S.L., IT Architecture for Dummies, Wiley Publishing, 2010.

3. Tinsley, T., Enterprise Architects: Masters of the Unseen City, BookSurge Publishing, 2009.

4. Perks, C., Beveridge, T., Guide to Enterprise IT Architecture, Springer, 2003.

5. Brooks, F.D., The Mythical Man-Month: Essays on Software Engineering, U.S: Addison-Wesley, 1995.

BITP 2113 Algorithm Analysis (3, 2, 2)

Learning Outcomes

Upon completing the course the student will be able to:

1. Explain in writing the concepts of algorithms
2. Apply the life cycle of algorithms
3. Analyze factors influencing the quality of algorithms.
4. Optimize source codes and SQL statements.

Synopsis

This course will expose students to write source code and SQL statements after considering the efficiency of algorithms. Topics cover introduction to algorithms analysis, code optimizing, algorithm design techniques, SQL and code tuning techniques.

References

1. A.Levithin, "The Design and Analysis of Algorithms, 3rd Edition", Pearson Education, 2012.

2. Sundar K. S, "Foundation Program: Analysis of Algorithms", Infosys, 2006.

3. G.T. Heineman, G. Pollice and S. Selkow, "Algorithms in a Nutshell", O'Reilly Media, 2008.

4. Weiss M, W.(1993) Data Structures and Algorithm Analysis in C, Benjamin Cummings.

5. S. Baase, S and A. Van Gelder, "Computer Algorithms: Introduction to Design and Analysis", 3rd edition. Addison Wesley, 2000

BITP 2313 Database Design (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Describe the database design process and its' importance in database system development life cycle.
2. Construct data model using Relational and non-Relational data modeling techniques.
3. Explain database design issues in specialized applications such as DSS and e-commerce.
4. Identify the best approach in building a database system that meets the functional requirements with the required quality of service.

Synopsis

This subject emphasizes the importance of database design and presents the fundamental principles of Relational and non-Relational data models which includes object oriented and object-Relational data model together with the enhanced features of entity-Relationship diagram. A practical database design Methodology is used to demonstrate the design process which involves not only constructing the data model but also checking and validating the accuracy of the model in line with the user transaction requirements.

References

1. Connolly, T. and Begg, C. (2015) Database Systems : A Practical Approach To Design, Implementation And Management, 6th Edition, Pearson Education.

2. Coronel, C. and Morris, S. (2015) Database Systems: Design, Implementation and Management, 11th Edition, Course Technology.

3. Suzanne, W.D. and Susan, D.U. (2005) An Advanced Course In Database Systems : Beyond Relational Databases, Pearson Education.

4. Elmasri, R and Navathe, S.B. (2015) Fundamentals of Database Systems, 7th Edition, Addison-Wesley.

BITP 3253 Software Verification and Validation (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Understand and choose suitable Methods used in testing and quality assurance.
2. Develop software testing and quality activity in real software projects.
3. Manage testing phase to assure software quality by using techniques and tools that full fill current requirement.

Synopsis

This course gives exposure to the students about the software testing concept and focus on process to develop and implement testing plan, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activity such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation.

References

1. Andreas Spillner et al.(2011), Software Testing Foundations, 3rd edition, January 2011, 296 pages, ISBN: 978-1-933952-78-9

2. Muller, Thomas et. al., (2007) ISTQB Certified Tester: Foundation Course in Software Testing. International Software Testing Qualification Board.

3. Cem Kaner, James Bach, Bret Pettichord (2002) Lessons Learned in Software Testing: A Context-Driven Approach, ISBN: 978-0-471-08112-8

4. Khan, RA., Mustafa K., Ahson, SI.,(2006).Software Quality: Concepts and Practices. Alpha Science.

BITP 3223 Software Project Management (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain activities and scopes to manage software development project
2. Manage software project start-up, monitoring, controlling and closing.
3. Writes formal software development plan document.

Synopsis

This course provides students with fundamental discipline in managing software development project. The course exposes students to a variety of techniques to prepare and manage people, budget, schedule, risks and quality of software project. The course also provides skills to the students how to use software tools in constructing software project plan such as Microsoft Project, MS Excel spreadsheets and MS Words.

References

1. Mohd Khanapi Abd Ghani (2011), Software Project Management: A guide to manage small software project development, Penerbit UTeM.

2. Joel Henry (2004), Software Project Mangement: A real-world guide to success, Pearson.

3. Clifford F. Gray & Erik W.Larson (2006), Project Management, Mc Graw-Hill

4. Bob Hughes and Mike Cotterell (2002), Software Project Management, McGraw-Hill.

BITP 3123 Distributed Application Development (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply the concept of distributed computing
2. Conform to the architecture of distributed application development
3. Develop an application for distributed environment.

Synopsis

The course exposes the students to the development of distributed programming applications which are used in the industry for network-based applications. Students are to be exposed to the introduction of distributed computing, multi-threading programming, client server application using socket programming, distributed object using RMI, web services and cloud computing.

References

1. Liang, Daniel Y., 2010, Introduction to Java Programming, Comprehensive (8th Edition), Prentice Hall

2. Farley, Jim, 1998, Java Distributed Computing, O'Reilly,

3. Hall, Marty and Hall, Larry, 2005, Core Servlets and JavaServer Pages (JSP) 2nd Edition, Prentice Hall

BITS 3423 Information Technology Security (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. Describe the concept, ethics and issues in internet technology security.
2. Identify the suitable components in providing security services and mechanism in computer software, operating system, and database and network system.
3. Implement an appropriate security system mechanism.

Synopsis

Security in Information Technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this subject, student will be able to learn security services that covered Confidentiality, Integrity and Availability (CIA) in ICT based system. This subject also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

1. Michael Goodrich, and Roberto Tamassia (2010), Introduction to Computer Security, Addison Wesley, ISBN 9780321512949.

2. W. Stallings (2010). Network Security Essentials: Applications and Standards, 4th edition, Prentice Hall, Inc, ISBN 978-0136108054.

3. D. Gollmann (2011). 3rd Edition, Computer Security, John Wiley & Sons, Inc, ISBN 978-0470741153

4. R. Bragg (2012). Certified Information systems Security Professional Training Guide, Que Certification, ISBN 0-7897-2801-

ELECTIVE SUBJECTS

BITP 2323 Database Administration

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain the concepts of database management system.
2. Take up the roles and responsibilities of the database.
3. Identify functions and architecture of database management system.
4. Analyze database performance.

Synopsis

This course discusses roles, issues and responsibilities of database administrator; functions and architecture of database management system and its relationship with the environment where it is implemented. Discussions also cover DBMS functions such as storage, access and updates of data; database object such as table space, indexes and user objects as well as data integrity, planning and implementation of activities for performance upgrading and user management.

References

1. Deirdre Matishak, Mark Fuller (2010), Oracle Database 11G: Administration Workshop I (Volume I & II), Edition 2.0, Jobi Varghese and Veena Narasimhan (Oracle Corporation).

2. Bert Rich, (2012), Oracle Database 2 Day DBA 11g Release 2 (11.2), (Oracle Corporation).

3. Oracle Corporation, (2014), Oracle® Database Express Edition,Getting Started Guide & Installation guide 11g Release 2 (11.2)

4. Mullins, Craig, S. (2012) Database Administration – The Complete Guide to Practices and Procedures Second Edition. Addison-Wesley.

5. McCullough-Dieter, Carol. (2003) Oracle9i Database Administrator–Implementationand Administration. Thomson Learning.

BITP 3233 Strategic Information Systems Planning (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain the business organization components, environment, challenges and objectives of information systems (IS) investment.
2. Discuss the IS and strategic planning tools used in planning process.
3. Propose information systems strategically appropriate for the business organization.

Synopsis

This subject will introduce the importance of information systems (IS) to enhance organisation competitiveness. Therefore the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitive than other organisations. Then students will work to integrate organisation's business objectives with IS that support its business direction and creating competitive advantage to the organisation.

References

1. Laudon, Kenneth C. & Laudon, Jane P.2011. Essentials of Business Information Systems, 9th Edition, Pearson.

2. Laudon, Kenneth C. & Laudon, Jane P.2012. Management Information Systems: Managing the Digital Firm, 12th Edition, Pearson.

3. Robson, Wendy. 1997. Strategic Management & Information Systems, 2nd Edition, Prentice Hall.

4. Ward, John & Peppard, Joe.2002. Strategic Planning for Information Systems, 3rdEdition, John Wiley & Sons.

5. McNurlin, Barbara C. & Sprague, J.R 2006. Information Systems and Management in Practice, 7th Edition, Pearson Prentice Hall.

6. Saunders, S. & Pearlson, E. 2004. Managing and Using Information System –A Strategic Approach, 2nd Edition, John Wiley & Sons.

BITP 3453 Mobile Application Development (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Understand the concept of mobile application development.
2. Differentiate the architecture of hybrid versus native development.
3. Develop a mobile application for a specific platform/operating system.

Synopsis

The course exposes the students to the development of mobile application development focusing on Android. Students are to be exposed to the introduction of native and hybrid application development as well as multi-threading programming and client server interaction via web services.

References

1. Zigurd Mednieks, Laird Dornin et al, Programming Android, O'Reilly.

2. Delessio, Darceyl, Conder, 2013, Android Application Development in 24 Hours3rd Edition, SAMS.

BITP 3443 Formal Methods (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Demonstrate the understanding of the usage of formal methods and its function in general.
2. Apply formal methods for specification, analysis and design.
3. Assess analysis techniques for appropriate usage.

Synopsis

This course covers the fundamentals of formal Methods and can be used as a basic course for software engineering. We will examine techniques for modeling and formally analyzing computing systems and will consider applications in software and hardware. Students will learn the fundamentals of classical logic, induction and recursion, program semantics, rewriting, reactive systems, temporal logic, model checking, and abstraction. We will examine how these Methods can be used to build reliable software and hardware.

References

1. Formal Methods: Industrial Used from Model to the Code. Boulanger, Jean-Louis (Ed.), Wiley, 2012. (ISBN: 978-1-84821-362-3)

2. Formal Methods and Models for System Design. A system level perspective. Gupta, R.; Le Guernic, P.; Shukla, S.K.; Talpin, J.-P. (Eds.), Springer-Verlag, 2004.

3. Mathematical Logic, Second Edition. H.-D. Ebbinghaus and J. Flum and W. Thomas. Springer- Verlag, 1994.

4. Computer-Aided Reasoning: An Approach. Matt Kaufmann, Panagiotis Manolios, and J Strother Moore. Kluwer Academic Publishers, June, 2000. (ISBN: 0-7923-7744-3)

5. Term Rewriting and All That. Franz Baader and Tobias Nipkow. Cambridge University Press, 1998. (ISBN: 0-521-77920-0)

6. Model Checking. Edmund M. Clarke, Jr., Orna Grumberg, and Doron A. Peled. MIT Press, 1999. (ISBN: 0-262-03270-8)

BITM 1123 Media Interactive Authoring

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain theories and knowledge of various interactive media applications using the multimedia authoring tools based on industrial requirements.
2. Demonstrate a systematic approach in developing interactive application for different multimedia domains and users.
3. Build interactivity in multimedia application based on the current authoring tools used by the industry.

Synopsis

This subject will introduce the various stages of interactive media project development from definition to the delivery of a multimedia product. The students will be introduced to instructional design followed by different stages in the product development including learning objects including prior analysis, the design, delivery considerations and evaluation. The lessons will also cover different models in instructional design, e-learning standards and concept of interactivity. Lab sessions will cover tools that assist the development on an interactive learning product including iBook Author and Unity. A complete project and report has to be submitted at the end of the semester.

References

1. Farah Nadia Azman, Interactive Media Authoring Lab Module, Penerbit UTeM, 2011.

2. Blaire, Preston, Cartoon Animation (The Collector's Series), Walter Foster, 2009.

3. Nellie McKesson and Adam Witwer, Publishing with iBooks Author, O'Reilly Media, Inc, 2012

4. Michael Garofalo, the Unofficial GameSalad® Textbook, Photics, 2012.

5. Ryan Henson Creighton, Unity 3D Game Development by Example, Beginner's Guide, Packt Publishing, 2010.

6. Ryan Henson Creighton, Unity 4. X Game Development by Example, Packt Publishing, 2013.

BITM 2113 Web Application Development (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Discuss the concept and the principle of Internet and WWW based on the latest technologies.
2. Use the important component in web application development which are Client Site Technology, Server Site Technology, Database Server and Web Server.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It

emphasis 4 components in developing web applications which are

§ Client Site Technologies: HTML, CSS, XML, and JavaScript

§ Server Site Technologies: PHP

§ Database Server: MySQL.

§ Web Servers: Apache

References

1. Robert W.Sebesta (2012), Programming The World Wide Web– 7th Edition, Addison Wesley, ISBN: 0132665816

2. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.

3. Robin Nixon (2009), Learning PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites, ISBN: 0596157134

4. Keith Darlington (2005), Effective Website Development – Tools and Techniques, Addison Wesley, ISBN: 0-321-18472-6

5. Luke Welling, Laura Thomson (2008), PHP and MySQL Web Development– 4th Edition, Addison-Wesley, ISBN: 0672329166

BITS 2313 Local Area Network (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Identify the suitable hardware and software for LAN communication.
2. Evaluate the fundamental principles that influence the selection of LAN hardware, LAN topology and LAN protocols.
3. Demonstrate the setup of LAN and the alternative that exist in the selection of hardware and transmission facilities when design and implementing LANs.

Synopsis

This course is an introduction to the current methods and practices in the use of Local Area Networks (LANs). The emphasis will be placed on LAN hardware and software, installation management and connection to other networks. Topics covered include network architecture, network communication protocols, end-to-end protocol stacks, network components, network management and the Open Systems Interconnection (OSI) reference model.

References

1. Steve McQuerry, David Jansen, David Hucaby, Cisco LAN Switching Configuration Handbook, 2nd Edition, CISCO Press (2009), ISBN-10: 1-58705-610-0

2. Wayne Lewis, *LAN Switching and Wireless, CCNA Exploration Companion Guide (Cisco Networking Academy* Program), CISCO Press (2012), ISBN 1587132737

3. Jr. Kenneth C. Mansfield, James L. Antonakos, Computer Networking for LANs to WANs: Hardware, Software and Security (Networking (Course

Technology)), Delmar Cengage Learning; 1 edition (2009), ISBN-10: 1423903161

4. James F. Kurose, Keith W. Ross, Computer Networking(Fourth Edition), Pearson Addision Wesley(2008), ISBN 0-321-51325-8

5. Behrouz A. Forouzan, Data Communications and Networking (4th Edition), McGraw-Hill Forouzan Networking Series(2006), ISBN 978-0073250328

6. William Stalling, Wireless Communications and Networks (2nd Editions), Pearson Education International(2005), ISBN 0-13-196790-8)

7. Behrouz A. Forouzan, Local Area Networks, McGraw-Hill Forouzan Networking Series(2003), ISBN 0-07-233605-6

8. Donald C. Lee, Enhanced IP Services for Cisco Networks ,Cisco Press (2002), ISBN1-57870-247-X

BITS 2513 Internet Technology (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Discover the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Select the system requirements aligned with the current technology advancement.
3. Display the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web-based knowledge also contribute to this phenomenon. This course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study include: basic concepts and client, networking, programming on the Internet, security and Internet applications.

References

1. James F.Kurose and Keith W. Ross, (2012). Computer Networking: A Top-Down Approach. 6th Edition, Pearson.

2. Brian Williams, Stacey Swayer (2010). Using Information Technology 9e Complete Edition.Career Education.

3. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing.

4. Douglas E. Comer (2007). The Internet 4th Edition. Pearson Prentice Hall.

5. Preston Gralla (2006). How Internet Works 8th Edition. Que Publishing

6. Fred T. Hofstetter (2005), Internet Technologies At Work, Mcgraw Hill Technology Education

7. Wahidah, Robiah, Siti Rahayu, Nurul Azma And Norharyati (2015). Internet Technology: Lab Companion. Penerbit Universiti, Utem.

BACHELOR OF COMPUTER SCIENCE (DATABASE MANAGEMENT) WITH HONOURS

COURSE LEARNING OUTCOMES

The learning objectives of this course are to produce knowledge and highly skilled graduates in the field of information and communication technology. Graduates pursuing the program are equipped with the in depth knowledge and specialized skills in database management area. This includes the ability to analyze, design, develop program using structured programming methods, manage and maintain database system which could meet the industrial needs in the field. Students should be able to develop data mining application with required security standard to protect the system database.

LEARNING OUTCOMES

Bachelor of Computer Science (Database Management) programme at FTMK intended to produce graduates with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to develop database by applying database concept using latest technology.
iv. Able to develop database application with standard security measures.
v. Able to administer and maintain database according to the standard procedure and policy.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various discipline and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self learning to obtain knowledge and skills.

CAREER PROSPECTS

Graduates specialized in Database Management have the opportunity to work as Database Analyst, Database System Administrator and Database Designer. They also could work as System Programmer, Information System Officer and System Analyst. The graduates also have the opportunity to further up their studies in Master and Doctorate level.

CURRICULUM STRUCTURE

Student must complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Database Management) degree. The programme consists of the components as follows:

Components Credit Hours
University Compulsory Subjects 18
Program Core Subjects 66
Course Core Subjects 24
Elective Subjects 12
TOTAL 120

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations – TITAS
BLHW 2712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English for Professional Communication
**BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (66 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITP 1113	Programming Technique
BITP 1123	Data Structure and Algorithm
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITP 3113	Object Oriented Programming
BITP 2213	Software Engineering

BITS 1123	Computer Organization and Architecture
BITS 1213	Operating System
BITS 1313	Data Communication and Networking
BITM 1113	Multimedia System
BITI 1113	Artificial Intelligence
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II

COURSE CORE SUBJECTS (24 credits)

BITP 2223	Software Requirement and Design
BITP 2303	Database Programming
BITP 2313	Database Design
BITP 2323	Database Administration
BITP 3223	Software Project Management
BITP 3363	Data Warehousing and Business Intelligence
BITP 3353	Multimedia Database
BITS 3433	Information Technology And Database Security

ELECTIVE SUBJECTS (12 credits)

Choose any 4 (FOUR) from the following

BITP 3233	Strategic Information System Planning
BITP 3253	Software Verification and Validation
BITP 3513	Advanced Database Programming
BITP 3533	Advanced Database Administration
BITS 2313	Local Area Network
BITS 2513	Internet Technology
BITI 2223	Machine Learning
BITM 2113	Web Application Development

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum I **	0	3	1	**This subject can be taken in any semester. Please refer to cocurriculum unit before registered.
BLHL ----	Third Language	1	2	2	
BITI 1213	Linear Algebra And Discrete Mathematics	2	0	2	
BITS 1123	Computer Organization and Architecture	2	2	3	
BITP 1113	Programming Technique	2	2	3	
BITM 1113	Multimedia System	2	2	3	
Total				15	

Note: International Student Only. BLHL 1012 Bahasa Melayu Komunikasi.

Year One (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum II **	0	3	1	**This subject can be taken in any semester. Please refer to co curriculum unit before registered.
BLHW 2712	Ethnic Relations	2	0	2	
BLHW 1702	Islamic and Asian Civilizations	2	0	2	
BITI 1223	Calculus and Numerical Methods	2	2	3	
BITP 1323	Database	2	2	3	
BITP 2213	Software Engineering	2	2	3	
BITP 1123	Data Structure and Algorithm	2	2	3	BITP 1113
Total				17	

Note:
1. BLHW 1702 Islamic and Asian Civilizations (local) is replaced with BLHW 1942 Malaysia Studies for International students
2. BLHW 2712 Ethnic Relations replace with BLHW 2752 Malaysian Culture (for international students)

Year Two (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITI 2233	Statistics and Probability				
BITU 2913	Workshop I	2	2	3	BITP 1113
BLHC 4032	Critical and Creative Thinking	0	9	3	
BITS 1213	Operating System	2	0	2	
BITM 2313	Human Computer Interaction	2	2	3	
BITP 2303	Database Programming	2	2	3	BITP 1323
BITP 2313	Database Design	2	2	3	BITP 1323
		2	2	3	
Total				20	

Note: International Student Only. BLHW 2752 Malaysian Culture.

Year Two (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 2403	Technical English	3	0	3	MUET >=3
BITI 1113	Artificial Intelligence	2	2	3	
BITS 1313	Data Communication & Networking	2	2	3	
BITP 3113	Object Oriented Programming	2	2	3	BITP 1123
BITP 2223	Software Requirement and Design	2	2	3	
BITP 2323	Database Administration	2	2	3	BITP 1323
Total				18	

Year Three (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English for Profesional Communications	3	0	3	BITU 2913
BITU 3923	Workshop II	0	9	3	BITP 2313
BITS 3433	Information Technology & Database Security	2	2	3	
BITP 3223	Software Project Management	2	2	3	BITP 1323
BITP 3363	Data Warehousing and Business Intelligence	2	2	3	
BIT- ----	Elective I	2	2	3	
		2	2	3	
Total				18	

Year Three (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BTMW 4012	Technology Entrepreneurship	2	0	2	
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BITP 3353	Multimedia Database	2	2	3	BITP 1323
BIT- ----	Elective II	2	2	3	
BIT- ----	Elective III	2	2	3	
BIT- ----	Elective IV	2	2	3	
Total				17	

*Equivalent to 25 hours of Self-Learning Time

Year Three (Special Semester)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
Total				3	

*Equivalent to 25 hours of Self-Learning Time

Year Four (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	BITU 3983
BITU 3946	Industrial Training Report	0	24	6	BITU 3983
Total				12	

Note: Pre requisite (completed all subject + MUET Band 2)

Elective Subjects

Below is a list of elective subjects can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subject given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITP 3233	Strategic Information System Planning	2	2	3	
BITP 3253	Software Verification and Validation	2	2	3	BITP 2213
BITP 3513	Advanced Database Programming	2	2	3	BITP 2303
BITP 3533	Advanced Database Administration	2	2	3	BITP 2323
BITS 2313	Local Area Network	2	2	3	
BITS 2513	Internet Technology	2	2	3	
BITI 2223	Machine Learning	2	2	3	BITI 1113
BITM 2113	Web Application Development	2	2	3	

List of elective subjects offered will be modified from time to time in accordance with industry needs.

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
B L HL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completion this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Discrete Mathematics. Topics for Linear Algebra include linear equations, matrices, and determinants, vectors in R^n, real vector spaces, eigenvalues, linear transformation, and introduction to linear programming. Topics for discrete mathematics consist of logics, sets, function, algorithms, integers, mathematical reasoning, counting, relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.", Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus and Numerical Methods [3, 2, 2]

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems

Synopsis

This course covers two areas of mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part topics consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References

1. Atkinson, K. and Han, W., 2004. *Elementary Numerical Analysis, 3rd* Ed., New York: John Wiley & Sons.
2. Atkinson, K., Han, W. Stewart, D.E., 2009. *Numerical Solution of Ordinary Differential Equations*., New Jersey: John Wiley & Sons.

3. Faires, J.D. and Burden, R.L., 2011. *Numerical Analysis*, 9th Ed., Boston: Brooks/Cole.

4. Fowler, J. and Snapp, B., 2014. *MOOculus Calculus* [online] Available at: https://mooculus.osu.edu [Accessed on 28 January 2015].

5. Heinbockel, J.H., 2012. *Introduction to Calculus* [online] Available at www.math.odu.edu/~jhh/Volume-1.PDF [Accessed on 28 January 2015].

6. Varberg,D., Purcell, E. J., and Rigdon,S.E., 2007. *Calculus,* 9th Ed., New Jersey: Pearson Education.

BITI2233 Statistics And Probability (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate understanding of the concept and fundamentals of statistics and probability.
2. Reproduce solutions for application problems using statistical software.
3. Solve application problems using appropriate statistical techniques.

Synopsis

This course will provide a comprehensive introduction to statistics and probability for computer science students. Topics that will be covered in this course include data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distribution. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing, estimation and hypothesis testing for two populations, simple linear regression and correlation, and one-way ANOVA. In this course, students are guided to use statistical software to perform descriptive and inferential statistics analysis

References

1. Navidi, W., (2014), “Statistics for Engineers and Scientists”, 4th Edition,McGraw-Hill Education.

2. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), “Probability and Statistics for Engineers & Scientist”, 9th Edition, Pearson Educational International.

3. Devore, J. L., (2011) “Probability and Statistics for Engineering and the Sciences”, 8th Edition, Thomson.

4. Montgomery, D. C., Runger, G. C.,(2011), “Applied Statistics and Probability for Engineers”, 3rd Edition, John Wiley.

5. Johnson, R., Freund, J., Miller, I., (2011), “Probability and Statistics for Engineers, 8th Edition”, Pearson Educational International.

6. Mann, P. S., (2013), “Introductory Statistics”, 8th Edition, Wiley.

7. Sh. Sara, Hanissah, Fauziah, Nortazi, Farah Shahnaz (2008), “Introduction to Statistics & Probability A Study Guide”, Pearson Educational International.

BITP 1113 Programming Technique (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications
2. Construct computer program codes by applying suitable programming tools, structures andtechniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and

operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.

2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures through Objects 7th Edition", Pearson Education International.

3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.

4. Liang, Y. D.(2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.

5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

BITP 1123 Data Structure and Algorithm (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation.
2. Apply the suitable data structures for an application that requires data structures.
3. Construct the data structures and algorithms in problem solving.

Synopsis

This course introduces the students to data structures and algorithms. The basic concepts in structure, class, array and pointer are discussed in order to understand the fundamental of data structures and algorithms. The course focuses on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics cover the algorithms. This also includes the algorithm efficiency for run time. Pseudo code and C++ programming language will be used in algorithm implementation. Apart from the theory, the students are asked to apply the data structures and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "C++ Programming: Program Design Including Data Structures". 7th, edition, Cengage Learning, 2014.

2. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++", 4thEdition, Addison Wesley, 2011.

3. Michael T. Goodrich, Roberto Tamassia& David M. Mount,"Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.

4. Goodrich, M. T., Tamassia, R. and Mount, D. M. (2011).Data structures and algorithms in C++.2nd edition, Hoboken, NJ, Wiley.

5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITM 2313 Human Computer Interaction (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Julie A. Jacko Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, Third Edition (Human Factors and Ergonomics), CRC Press 2012.

2. Ben Shneiderman et al, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition), 2009.

3. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (2nd Edition), John Wiley & Sons, 2007.

4. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.

BITP 1323 Database (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Construct queries using Relational Algebra
2. Design a Relational database
3. Construct simple and complex SQL queries

Synopsis

This is an introductory course to database and file management system. It assists students to form an understanding to data modeling, file management and database system functionality in information system. The students will be introduced to the process of designing, developing and executing database applications. This course focuses on practical skills to create, control and execute SQL statement.

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.

4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 3113 Object Oriented Programming (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model

problem solutions and express the Relationsship among classes.
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.
3. Perform implementation of classes and Methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs.

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures, GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop a complete Java applications with database.

References

1. Deitel, H. M. & Deitel, P. J., Java How To Program, 7th Ed., Pearson Education International, 2006.

2. Liang, Y. Daniel, Introduction Java Programming, 6th Ed., Prentice Hall, 2005.

3. Bronson, Gary J., Object Oriented Program Development Using Java – Class Centered Approach, Thomson Course Technology, 2004.

4. Doke, E. Reed, Satzinger, John W. & Williams, Susan Rebstock, Object-Oriented Application Development Using Java, Thomson Course Technology, 2002.

BITP 2213 Software Engineering (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Apply the concept of software engineering for system development.
2. Explain the principles and practices of software engineering in the system development.
3. Follow the standard guideline to produce formal specifications and software modeling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Sommerville, I., Mac 2015, Software Engineering, 10th Edition, Addison-Wesley.

2. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.

3. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.

4. Chemuturi, M. And Caghley, T. M. J., 2010, Mastering Software Project Management: Best Practices, Tools and Techniques, J. Ross Publishing.

5. Bruegge, B. and Dutoit, A. H., 2010, Object-oriented Software Enginering: Using UML, patterns and Java, Prentice Hall

6. Pressman, Roger S., 2010, Software Engineering: A Practitioner's Approach, Seventh (7th) Edition, McGraw-Hill.

7. Ahmad, S. et al, (2013), A Student's Guide: UML for Software Engineering, Penerbit UTeM.

BITS 1123 Computer Organization and Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input / Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013). *Computer Organization and Design: The Hardware/Software Interface, 5th Edition*. Morgan Kauffman.

2. Linda Null and Julia Lobur (2014). The *Essentials of Computer Organization and Architecture,* 4th *Edition*. Jones & Bartletts Pub.
3. Syarulnaziah, Zakiah, Marliza, Aslinda. *Lab Module: Computer Organization and Architecture With MIPS Programming.*

4. William Stallings, (2013). *Computer Organization and Architecture, 9th Edition.* Pearson.

5. Andrew S. Tanenbaum, (2013). *Structured Computer Organization 6th Edition*. Prentice Hall.

6. Irv. Englander (2014).*The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.*John Wiley & Sons.

BITS 1213 Operating System (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts, theory and technology used in operating system.
2. Demonstrate the major components and functionalities of an operating system.
3. Display the basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.

2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed, Addison-Wesley.

3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.

4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.

5. www.ubuntu.com

BITS 1313 Data Communication and Networking (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Build the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Manipulate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understands the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and apply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring basic computer networks using guided or unguided media.

References

1. Forouzan, Behrouz A., 2012. *Data Communications and Networking*, 5th Edition, McGraw-Hill.

2. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. *Lab Companion: Data Communications and Networking*, 1st Edition.

3. William Stallings, 2013. *Data and Computer Communications*, 10th Edition, Pearson.

4. Massoud Moussavi, 2011. *Data Communication and Networking: A Practical Approach*, 1st Edition, Cengage Learning.

5. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, *Business Data Communications and Networking*, 12th Edition, Pearson

6. Bahaman, Nazrulazhar, Hamid, Erman and Mat Ariff, Azman, 2013. *Data Communications and Networking: Practical Approach*, 3rd Edition, Venton.

7. Curt M. White, 2012. Data Communications and Computer Networks, Cengage Learning

8. Randall J. Boyle, Jeffrey A. Clements, 2013. *Applied Networking Labs,* 2nd Edition, Prentice Hall

BITM 1113 Multimedia System (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Interpret the core concept of multimedia elements (C2, P1).
2. Construct multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs (C3, LL2).
3. Demonstrate problem solving skills for multimedia project development (P2, A1, and CTPS1).

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D/3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communcation skills while performing their various tasks and project. Cooperative Learning (CL), Problem Based Learning (PBL), Cooperative Learning and Collaborative Learning approach will be used to enhance student's capability such as competency, attitude, knowledge and communication skills.

References

1. Norasiken, B., Huoy, C. Y., Mohamad Lutfi, D., Farah, N. A. & Ahmad, N. C. P., (2014), Multimedia System, University Technical Malaysia Melaka, Module.
2. Vaughan, T., (2014), Multimedia: Making It Work 8th Edition (Ninth Edition), McGraw-Hill Osborne Media.
3. Philips, R., (2013), The Developer's Handbook to Interactive Multimedia, Routledge – Taylors & Francis Group.
4. Burg, J., (2009), the Science of Digital Media, Prentice Hall.
5. Li, Z., Drew, M. S., and Liu, J., (2014) Fundamental of Multimedia (Second Edition), Springer.

BITI 1113 Artificial Intelligence (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the definition of Artificial Intelligence and its techniques.
2. Classify the types of Artificial Intelligence techniques.
3. Follow the Artificial Intelligence techniques in problem solving.

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References

1. Russel, S & Norvig, P. (2010). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
2. Luger, G. F. (2015). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Pearson Education.

3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.

4. Kopec, D, Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

BITU 2913 Workshop I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Use the knowledge that had been learned especially in programming technique to build, run and develop a project.
2. Identify and solve problems in a systematic way.
3. Defend and debate the result of the project.

Synopsis

The aim of Workshop 1 is to provide the students with experience and skills to develop and present an individual project. Students must use the knowledge learnt to solve the problems and think creatively to achieve their projects' objectives and scopes. Students should be able to apply programming technique in their projects. The systems/applications developed must have logic process flow, robust, consistent, have attractive user interface and are able to detect errors in input/output data. At the final stage of this workshop, the students must present and defend their project. A supervisor will supervise the students for the whole 12 weeks and will evaluate the progress during the implementation and final presentation. This course is also a fundamental course to prepare the students for industrial training.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.

2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son, 2012.

3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.

4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.

5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify and analyze project scopes based on their majoring
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives
2. Practise the knowledge and skills that they've learned in classes throughout their internship
3. Develop interpersonal skill by interacting and communicating with staff, colllegues and personnel
4. Elaborate technical tasks performed into a technical journal

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Elaborate a report based on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with basic literature review.
2. Develop project using an appropriate method.
3. Defend the output.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, PSM Report Guideline Book, FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, PSM Report Guideline Reference, FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3, 0, 25)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has the potential commercial value.
3. Defend the output.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, PSM Report Guideline, FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, PSM Report Guideline Book, FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, PSM Report Guideline Reference, FTMK, Universiti Teknikal Malaysia Melaka.

COURSE CORE SUBJECTS

BITP 2223 Software Requirement and Design (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Analyze software requirement and design the software using object oriented approach and UML.
2. Model software analysis, software requirement and software design using object oriented approach supported by case tool, StarUML.
3. Identify and solve common design problem using Design Pattern concept.

Synopsis

This course introduces the student to the object oriented approach using UML such as object-oriented concept, object

oriented application development life cycle, UML history and notation, comparison between OOAD and SDM and introduction to object and class. This course includes the use-case model to capture the requirement using use case diagram and use case description. They will learn to identify the uses cases, actors, perform analysis modeling sing dynamic or static diagram such as activity diagram, sequence diagram, collaboration diagram and class diagram.

References

1. Karl Wiegers, Joy Beatty, Software Requirements, Third Edition, Microsoft, 2014.

2. Alan Dennis, Barbara Haley Wixom and David Tegarden, System Analysis and Design with UML: An Object-Oriented approach 3rd Edition, Wiley 2010

3. Mohd Khanapi Abd Ghani, and Sufian Sulaiman, Lab Module - Software Requirement Analysis and Design: Object-oriented approach with UML.Penerbit UTeM, 2011

4. Martin Fowler, UML Distilled Third Edition A Brief Guide to the Standard Object Modeling Language, Addison Wesley 2012

5. Ian Sommerville, Software Engineering 6th Edition, Addison Wesley 2012

6. Cay Horstman, Object Oriented Design and Patterns, John Wiley and Sons 2012

7. Alan Shalloway, James Trott Design Patterns Explained: A New Perspective on Object-Oriented Design, 2/E, Addison-Wesley Professional, 2012

8. Jim Arlow, Ila Neustadt UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2/E, Addison-Wesley Professional, 2012

BITP 2303 Database Programming (3, 0, 6)

Learning Outcomes

At the end of this course, students will have the ability to:

1. Explain features, syntax, purpose and benefits of SQL and PL/SQL to developer and database administrator.
2. Use the procedures, functions, packages and database triggers, and manipulate large object sizes.
3. Use the Oracle supplied packages.

Synopsis

The contents of this course are based on the syllabus of two modules in Oracle certification (Oracle Certified Associate). The first part of the lesson introduces the concepts of Relationsal database and SQL syntax. This includes topics related to Oracle database architecture, its ability, constraints in data integrity, and other database objects such as views, index, sequence and synonyms. The second part of the lesson explains the objectives, functions and benefits of PL/SQL in developing database applications.

References

1. N. Pataballa and P. Nathan (2001). Introduction to Oracle9i: SQL, Volume 1 and Volume 2, Oracle University.

2. N. Pataballa and P. Nathan (2001). Oracle9i: Program with PL/SQL, Volume 1 and Volume 2, Oracle University.

3. M. McLaughlin and J. Harper (2010), Oracle Database 11g PL/SQL Programming Workbook (Oracle Press).

4. S. Feuerstein and B. Pribyll (2014), Oracle PL/SQL Programming, 6th ed. Oreilly Media Inc.

5. C. Mcdonald, W. C. Katz, C. Beck, J. R. Kallman, D. C. Knox, C. Katz, R. Kallman, E. Board, S. Anglin, D.

Appleman, G. Cornell, J. Cox, T. Davis, K. Watterson, G. Wray, and J. Zukowski, Mastering Oracle PL / SQL : Practical Solutions. Apress, 2004.

BITP 2313 Database Design (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Describe the database design process and its' importance in database system development life cycle.
2. Construct data model using Relational and non-Relational data modeling techniques.
3. Explain database design issues in specialized applications such as DSS and e-commerce.
4. Identify the best approach in building a database system that meets the functional requirements with the required quality of service.

Synopsis

This subject emphasizes the importance of database design and presents the fundamental principles of Relational and non-Relational data models which includes objectoriented and object-Relational data model together with the enhanced features of entity-Relationship diagram. A practical database design Methodology is used to demonstrate the design process which involves not only constructing the data model but also checking and validating the accuracy of the model in line with the user transaction requirements.

References

1. Connolly, T. and Begg, C. (2015) Database Systems: A practical approach to design, implementation and management, 6th Edition, Pearson Education.

2. Coronel, C., Morris, S. and Rob, P. (2016) Database Principles Fundamentals of Design, Implementation and Management, 12th Edition, Course Technology.

3. Hoffer, J.A., Ramesh, V. and Topi, UH (2015). Modern Database Management, 12th Edition, Pearson Education.

4. Elmasri, R and Navathe, S.B. (2015) Fundamentals of Database Systems, 7th Edition, Addison-Wesley.

BITP 2323 Database Administration

Learning Outcomes

At the end of the lesson, students should be able to :

1. Explain the concepts of database management system.
2. Take up the roles and responsibilities of the database.
3. Identify functions and architecture of database management system.
4. Analyze database performance.

Synopsis

This course discusses roles, issues and responsibilities of database administrator; functions and architecture of database management system and its relationship with the environment where it is implemented. Discussions also cover DBMS functions such as storage, access and updates of data; database object such as table space, indexes and user objects as well as data integrity, planning and implementation of activities for performance upgrading and user management.

References

1. Deirdre Matishak, Mark Fuller (2010), Oracle Database 11G: Administration Workshop I (Volume I & II), Edition 2.0, Jobi Varghese and Veena Narasimhan (Oracle Corporation).

2. Bert Rich, (2012), Oracle Database 2 Day DBA 11g Release 2 (11.2), (Oracle Corporation).

3. Oracle Corporation, (2014), Oracle® Database Express Edition, Getting Started Guide & Installation guide 11g Release 2 (11.2)

BITP 3223 Software Project Management (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain activities and scopes to manage software development project
2. Manage software project start-up, monitoring, controlling and closing.
3. Writes formal software development plan document.

Synopsis

This course provides students with fundamental discipline in managing software development project. The course exposes students to a variety of techniques to prepare and manage people, budget, schedule, risks and quality of software project. The course also provides skills to the students how to use software tools in constructing software project plan such as Microsoft Project, MS Excel spreadsheets and MS Words.

References

1. Mohd Khanapi Abd Ghani (2011), Software Project Management: A guide to manage small software project development, Penerbit UTeM.

2. Joel Henry (2004), Software Project Mangement: A real-world guide to success, Pearson.

3. Clifford F. Gray & Erik W.Larson (2006), Project Management, Mc Graw-Hill

4. Bob Hughes and Mike Cotterell (2002), Software Project Management, McGraw-Hill.

BITP 3363 Data Warehousing and Business Intelligence (3, 2, 2)

Learning Outcomes

Upon completion of this course, the students should be able to:

1. Explain the concepts, components and purpose of data warehousing.
2. Design data warehouses based on the data warehousing model and lifecycle.
3. Apply the techniques and tools related to business intelligence.

Synopsis

This subject focuses on data warehousing fundamentals which includes the importance of data warehousing, multi-dimensional data analysis and factors involved in the analysis, planning, design, loading, maintenance and exploitation of successful data warehouse. It will also cover the tools and techniques supporting business intelligence such as decision making system, query and reporting, online analytical processing (OLAP), Statistical analysis, forecasting and data mining.

References

1. Ciampa, B. 2014. The Data Warehouse Workshop: Providing Practical Experience to the Aspiring ETL Developer, Createspace Independent.

2. Vaisman, A, & Zimányi, E. 2014. Data Warehouse Systems: Design and Implementation (Data-Centric Systems and Applications), Springer.

3. Krishnan, K. 2013. Data Warehousing in the Age of Big Data, Morgan Kaufmann.

4. North, M.A., 2012. Data Mining for the Masses, Global Text.

5. Sabherwal, R. & Becerra-Fernandez, I. 2011. Business Intelligence: Practices, Technologies and Management, Wiley.

BITP 3353 Multimedia Database

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the fundamental concept of multimedia database and its requirements.
2. Demonstrate understanding in dealing with various multimedia data types.
3. Apply the multimedia database design concept in storing and retrieving multimedia data.

Synopsis

Multimedia Database Management Systems (MMDBMSs) is a DBMS that supports both traditional and multimedia data types, and is capable of handling large collections of multimedia entities. This subject revolves around fundamental components that need to be integrated into conventional database management systems to make them practical for developing multimedia database applications

References

1. Dunckley, L. (2003), Multimedia Databases: An Object-Relational Approach, UK: Pearson.

2. Kratochvil, M. (2013), Managing Multimedia and Unstructured Data in the Oracle Database, PACKT Publishing.

3. Candan, K.S. and Sapino, M.L. (2010), Data Management for Multimedia Retrieval. Cambridge University Press.

4. Lu, G. (1999), Multimedia Database Management Systems, UK.

5. Subrahmanian, V.S. (1998), Principles of Multimedia Database systems, Morgan Kaufmann.

BITS 3433 Information Technology And Database Security (3, 2, 2)

Learning Outcomes

At the end of this course, students will be able to:

1. Explain information technology security in database system environment
2. Identifies database security vulnerabilities, threats and risk.
3. Construct security measures to enforce confidentiality, integrity and availability of information.

Synopsis

This course introduces the basic concepts of data security in an environment that involves databases, computer systems and networks, and the Internet. It outlines fundamental data security requirements and explains the risks that threaten the integrity and privacy of organizational data. Students are introduced to several technologies that can contribute to system and database security such as Access Control, Cryptography, Authentication Methods, User Administration, Virtual Private Database and Database Auditing.

References

1. C.P. Pfleeger, S.L. Pfleeger (2015). Security in computing 5th Edition, Prentice Hall International, Inc.

2. Afyouni, Hassan A. (2006) Database Security And Auditing – Protecting Data Integrity And Accessibility. Thomson-Course Technology.

3. Craig S., Mullins (2013) Database Administration – The Complete Guide to DBA Practices and Procedures. Addison-Wesley.

4. Merkow, M. and Breithaupt, J. (2011) Information Security: Principles and Practices. Pearson Prentice Hall.

5. Maiwald, E. (2013) Network Security – A Beginner's Guide. Mac Graw-Hil

ELECTIVE SUBJECTS

BITP 3233 Strategic Information Systems Planning (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain the business organization components, environment, challenges and objectives of information systems (IS) investment.

2. Discuss the IS and strategic planning tools used in planning process.

3. Propose information systems strategically appropriate for the business organization.

Synopsis

This subject will introduce the importance of information systems (IS) to enhance organisation competitiveness. Therefore the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitive than other organisations. Then students will work to integrate organisation's business objectives with IS that support its business direction and creating competitive advantage to the organisation.

References

1. Laudon, Kenneth C. & Laudon, Jane P.2011. Essentials of Business Information Systems, 9th Edition, Pearson.

2. Laudon, Kenneth C. & Laudon, Jane P.2012. Management Information Systems: Managing The Digital Firm, 12th Edition, Pearson.

3. Robson, Wendy. 1997. Strategic Management & Information Systems, 2nd Edition, Prentice Hall.

4. Ward, John & Peppard, Joe.2002. Strategic Planning for Information Systems, 3rd Edition, John Wiley & Sons.

5. McNurlin, Barbara C. & Sprague, J.R 2006. Information Systems and Management in Practice, 7th Edition, Pearson Prentice Hall.

6. Saunders, S. & Pearlson, E. 2004. Managing and Using Information System – A Strategic Approach, 2nd Edition, John Wiley & Sons.

BITP 3253 Software Verification and Validation (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Understand and choose suitable Methods used in testing and quality assurance
2. Develop software testing and quality activity in real software projects.
3. Manage testing phase to assure software quality by using techniques and tools that full fill current requirement.

Synopsis

This course gives exposure to the students about the software testing concept and focus on process to develop and implement testing plan, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activity such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation.

References

1. Andreas Spillner et al.(2011), Software Testing Foundations, 3rd edition, January 2011, 296 pages, ISBN: 978-1-933952-78-9

2. Muller, Thomas et. al., (2007) ISTQB Certified Tester: Foundation Course in Software Testing. International Software Testing Qualification Board.

3. Cem Kaner, James Bach, Bret Pettichord (2002) Lessons Learned in Software Testing: A Context-Driven Approach, ISBN: 978-0-471-08112-8

4. Khan, RA., Mustafa K., Ahson, SI.,(2006).Software Quality: Concepts and Practices. Alpha Science.

BITP 3513 Advance Database Programming (3, 2, 2)

Learning Outcomes

After completing this course, the student should be able:

1. To produce a form with components for database interaction and GUI controls
2. To construct form modules in multiple windows and a variety of layout styles using a Web Browser
3. To select triggers for various events such as adding functions, control implementation, transaction processing and controlling user interaction.

Synopsis

This course gives opportunity for the students to develop, test and deploy interactive internet applications using Oracle Forms Developer software. Working in a graphical user interface (GUI) environment, students will learn how to create and customize forms with user input items such as check boxes, list items, and radio groups. Student will also learn how to modify data access by creating event related triggers, and display Forms elements and data in multiple canvases and windows. This course is designed to prepare the students for the corresponding Oracle Certified Professional (OCP) certification.

References

1. Gamer, P. 2002. Oracle 9i Forms Developer: Build Internet Aplications Volume 1, 2, 3 – Student Guide. Oracle Corporation.

2. Palinski, J. 2003. Oracle 9i Developer Developing Web Application with Forms Builder. Thomson Learning.

3. Brown, B.D. 2001. Oracle 9i Web Development. McGraw-Hill Education – Europe.

4. Sunderraman, Rajshekar, Riccardi, Greg. 2004. Database Management: With Website Development Applications and Oracle 9i Programming – A Primer. Pearson Higher Education.

BITP 3523 Advance Database Administration (3, 2, 2)

Learning Outcomes

After completing this course, the student should be able:

1. List the concepts of identity and comparing the database optimization.
2. Identify, troubleshoot and solve common problems related to database performance.
3. Describe the strategies and techniques used for tuning Oracle 9i server and the importance of the initial design of the database.

Synopsis

This course is an advanced course for database administration. It will help students improve understanding of tuning or optimization of database performance. The curriculum covers how to use oracle tools to identify, troubleshoot, and solve common problems related to oracle database administration. This syllabus is based on oracle certification path, and it is one of the

requirements for obtaining a certificate ocp (oracle certified professional).

References

1. Kilpatrick, P., Raman, S., Womack, J. (2003), Oracle 9i Database Performance Tuning: Volume 1 and 2 – Student Guide. Oracle Corporation.

2. Kuhn, D. (2010) Pro Oracle Database 11g Administration, Apress.

3. Burleson, D. K. (2002), Oracle 9i High Performance Tuning with STATSPACK. McGraw-Hill Companies Inc.

4. Burleson, D. K. (2003), Creating a Self – Tuning Oracle Database – Automating Oracle 9i Dynamic SGA Performance. Rampant TechPress.

5. Niemiec, R. J. (2003) Oracle 9i Performance Tuning Tips and Techniques. McGraw-Hill Companies Inc.

BITS 2313 Local Area Network (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts and elements of LAN and their uses.
2. Investigate the suitable hardware and software required for LAN communications.
3. Evaluate the fundamental principles that influence the selection of LAN hardware, LAN topology and LAN protocols.
4. Build the setup of a LAN and the alternatives that exist in the selection of hardware, software and transmission facilities when designing and implementing LANs.

Synopsis

This course is an introduction to the current methods and practices in the use of Local Area Networks (LANs). The emphasis will be placed on LAN hardware and software, installation management and connection to other networks. Topics covered include network architecture, network communication protocols, end-to-end protocol stacks, network components, network management and the Open Systems Interconnection (OSI) reference model.

References

1. Steve McQuerry, David Jansen, David Hucaby, Cisco LAN Switching Configuration Handbook, 2nd Edition, CISCO Press (2009), ISBN-10: 1-58705-610-0

2. Wayne Lewis, *LAN Switching and Wireless, CCNA Exploration Companion Guide (Cisco Networking Academy* Program), CISCO Press (2012), ISBN 1587132737

3. Jr. Kenneth C. Mansfield, James L. Antonakos, Computer Networking for LANs to WANs: Hardware, Software and Security (Networking (Course Technology)), Delmar Cengage Learning; 1 edition (2009), ISBN-10: 1423903161

4. James F. Kurose, Keith W. Ross, Computer Networking(Fourth Edition), Pearson Addision Wesley(2008), ISBN 0-321-51325-8

5. Behrouz A. Forouzan, Data Communications and Networking (4th Edition), McGraw-Hill Forouzan Networking Series(2006), ISBN 978-0073250328

6. William Stalling, Wireless Communications and Networks (2nd Editions), Pearson Education International(2005), ISBN 0-13-196790-8)

7. Behrouz A. Forouzan, Local Area Networks, McGraw-Hill Forouzan Networking Series(2003), ISBN 0-07-233605-6

8. Donald C. Lee, Enhanced IP Services for Cisco Networks ,Cisco Press (2002), ISBN1-57870-247-X

BITS 2513 Internet Technology (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Discover the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Select the system requirements aligned with the current technology advancement.
3. Display the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web-based knowledge also contribute to this phenomenon. This course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study include: basic concepts and client, networking, programming on the Internet, security and Internet applications.

References

1. James F.Kurose and Keith W. Ross, (2012). Computer Networking: A Top-Down Approach. 6th Edition, Pearson.

2. Brian Williams, Stacey Swayer (2010). Using Information Technology 9e Complete Edition.Career Education.

3. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing.

4. Douglas E. Comer (2007). The Internet 4th edition. Pearson Prentice Hall.

5. Preston Gralla (2006). How Internet Works 8th edition. Que Publishing

6. Fred T. Hofstetter (2005), Internet Technologies at Work, McGraw Hill Technology Education

7. Wahidah, Robiah, Siti Rahayu, Nurul Azma and Norharyati (2015). Internet Technology: Lab Companion. Penerbit Universiti, UTeM.

BITI 2223 Machine Learning [3, 2, 2]

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate the fundamental concept of machine learning theory.
2. Select the appropriate techniques in machine learning problem solving.
3. Demonstrate machine learning algorithm based on machine learning concepts.

Synopsis

Students are exposed to the foundation of machine learning, which is the study of how to build a computer system that learns from experience. The course starts with an overview of Data Mining for a background study. Main topics that will be covered are such as concept learning, decision tree learning, Bayesian learning, instance-based learning, learning sets of rules, and reinforcement learning. Besides, some applications of machine learning including robotic control, autonomous navigation, bioinformatics, speech recognition, and web data processing will be introduced.

References

1. Flach, P., (2012), Machine Learning: The Art and Science of Algorithms that Make Sense of Data, Cambridge University Press.
2. Stephen Marsland (2009), Machine Learning: An Algorithmic Perspective, Chapman & Hall/Crc Machine Learning & Pattern Recognition
3. Witten, I.A., Frank, E., (2011), Data Mining: Practical Machine Learning and Techniques (Third Edition), Morgan Kaufmann.
4. Roges, S. and Girolami, M., (2011), A First Course in Machine Learning, 1st edition, Chapman and Hall/CRC.
5. Barber, D., (2012), Bayesian Reasoning and Machine Learning, Cambridge University Press

BITM 2113 Web Application Development (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Explain the concept and the principle of Internet and WWW based on the latest technologies.
2. Develop a dynamic web site using Mark-up language, Client-side scripting and Server-side scripting.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide the students with a comprehensive understanding of the tools and problem solving techniques related to the development of effective World Wide Web. It emphasizes on four (4) components of Web application development which are:

• Client Site Technologies: HTML, XHTML, CSS, XML, and JavaScript

• Server Site Technologies: PHP

• Database Server: MySQL.

• Web Servers: Apache

References

1. Robert W.Sebesta (2012), Programming The World Wide Web – 7th Edition, Addison Wesley, ISBN: 0132665816
2. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.
3. P.J.Dietel, and H. M. Deitel, (2009), Internet & World Wide Web How to Program – 4th Edition, Pearson, ISBN: 0136035426
4. Keith Darlington (2005), Effective Website Development – Tools and Techniques, Addison Wesley, ISBN: 0-321-18472-6

BACHELOR OF COMPUTER SCIENCE (INTERACTIVE MEDIA) WITH HONOURS

COURSE LEARNING OUTCOMES

Bachelor of Computer Science (Interactive Media) academic programme is offered to prepare graduates with a thorough understanding and superior skills in information technology particularly in the area of multimedia. The learning outcomes of this programme are to equip the students with the basic knowledge in every aspect of information technology, to provide the students with sufficient theoretical knowledge and skills to apply the knowledge learnt through the practiced concept , enable the students to be able to apply the interactivity concept in the design and development of multimedia-based application, equip the students with deep understanding and high skills in the development and management of web sites, animation, computer graphics, virtual reality and development of computer games, produce graduates that are capable to develop high quality interactive media products and multimedia applications which fulfill the industry specifications.

LEARNING OUTCOMES

The purpose of FTMK offering the Bachelor of Computer Science (Interactive Media) is to produce students with the following qualities:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to apply interactivity concept in designing and developing multimedia-based applications and products.
iv. Able to analyze requirements, configure, implement and maintain digital audio/video equipments.
v. Able to develop multimedia application with the quality that fulfills industry specifications.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurshipship skills.
ix. Able to perform continuous self learning to obtain knowledge and skills.

CAREER PROSPECTS

Our aim is to give produce highly knowledgeable and skillful graduates in the field of multimedia. They will have the opportunities to start careers such as Web designer or developer, computer games designer, computer graphics designer, animator, digital audio video engineer, user interface designer, interactive media application developer and multimedia consultant. On the other hand, the graduates may also choose career based on their basic knowledge in Computer Science and ICT such as programmer and information system officer or system analyst.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Interactive Media) degree.The programme consists of components as follows:

Components	Credit Hours
University Compulsory Subjects	18
Program Core Subjects	66
Course Core Subjects	24
Elective subjects	12
TOTAL	120

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations– TITAS
BLHW 2 712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English for Professional Communication
**BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (66 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITP 1113	Programming Technique
BITP 1123	Data Structure and Algorithm
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITP 3113	Object Oriented Programming
BITP 2213	Software Engineering
BITS 1123	Computer Organization and Architecture
BITS 1213	Operating System
BITS 1313	Data Communication and Networking
BITM 1113	Multimedia System
BITI 1113	Artificial Intelligence
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II

COURSE CORE SUBJECTS (24 credits)

BITM 1123	Interactive Media Authoring
BITM 2123	Digital Audio and Video Technology
BITM 2213	Computer Animation
BITM 3133	Computer Games Development
BITM 3113	Interactive Media Project Management
BITM 3213	Interactive Computer Graphics
BITM 3223	Virtual Reality Technology
BITS 3423	Information Technology Security

ELECTIVE SUBJECTS (12 credits)

Choose any 4 (FOUR) from the following.

BITE 3623	Motion Graphics
BITP 2223	Software Requirements and Design
BITP 3353	Multimedia Database
BITM 3413	Geographical Information System
BITS 2513	Internet Technology
BITM 2113	Web Application Development
BITP 3453	Mobile Application Development
BITI 2223	Machine Learning

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 1702	Islamic and Asian Civilizations	2	0	2	
BKK- ----	Co-Curriculum I **	0	3	1	
BLHW 2712	Ethnic Relations	2	0	2	
BITI 1213	Linear Algebra and Discrete Mathematics	2	2	3	
BITP 1113	Programming Technique	2	2	3	
BITS 1123	Computer Organization and Architecture	2	2	3	
BITM 1113	Multimedia Systems	2	2	3	
	TOTAL			17	

Note : 1. BLHW 1702 Islamic and Asian Civilizations (local) is replaced with BLHW 1942 Malaysia Studies for International students.
2. BLHW 2712 Ethnic Relations replace with BLHW 2752 Malaysian Culture (for International students).

Year One (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 2403	Technical English	3	0	3	
BKK- ----	Co-Curriculum II **	0	3	1	
BITI 1223	Calculus and Numerical Methods	2	2	3	
BITS 1213	Operating Systems	2	2	3	
BITP 1123	Data Structure and Algorithms	2	2	3	BITP 1113
BITP 1323	Database	2	2	3	
BITM 1123	Interactive Media Authoring	2	2	3	
	TOTAL			19	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.
Note: International Student Only. BLHW 1942 Malaysian Studies for International Student.

Year Two (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHC 4032	Critical and Creative Thinking	2	0	2	
BLHL -----	Third Language	1	2	2	
BITU 2913	Workshop I	0	9	3	BITP 1113
BITI 1113	Artificial Intelligence	2	2	3	
BITS 1313	Data Communication and Networking	2	2	3	
BITM 2213	Computer Animation	2	2	3	
BITM 2123	Digital Audio and Video Technology	2	2	3	
	TOTAL			19	

Note: International Student Only. BLHW 2752 Malaysian Culture.

Year Two (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BTMW 4012	Technology Entrepreneurship	2	0	2	
BITI 2233	Statistics and Probability	2	2	3	
BITP 3113	Object Oriented Programming	2	2	3	BITP 1123
BITM 3213	InteractiveComputer Graphics	2	2	3	
BITM 2313	Human-Computer Interaction	2	2	3	
BIT- ----	Elective I	2	2	3	
	TOTAL			17	

Year Three (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English For Professional Communication	3	0	3	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITP 2213	Software Engineering	2	2	3	
BITM 3113	Interactive Media Project Management	2	2	3	
BITM 3133	Computer Games Development	2	2	3	
BIT- ----	Elective II	2	2	3	
	TOTAL			18	

Year Three (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English For Professional Communication	3	0	3	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITP 2213	Software Engineering	2	2	3	
BITM 3113	Interactive Media Project Management	2	2	3	
BITM 3133	Computer Games Development	2	2	3	
BIT- ----	Elective II	2	2	3	
	TOTAL			18	

Year Three (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BITM 3223	Virtual Reality Technology	2	2	3	
BITS 3423	Information Technology Security	2	2	3	
BIT- ----	Elective III	2	2	3	
BIT- ----	Elective IV	2	2	3	
	TOTAL			15	

*Equivalent to 25 hours of Self-Learning Time

Year Three (Special Semester)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
	TOTAL			3	
* Equivalent to 25 hours of Self-Learning Time (SLT)					

Year Four (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	
BITU 3946	Industrial Training Report	0	24	6	
	TOTAL			12	
Note: Requisite (Completed all subjects + MUET band 2)					

Elective Subjects

Below is a list of elective subjects can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subject given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITE 3623	Motion Graphics	2	2	3	
BITM 3413	Geographical Information System	2	2	3	
BITP 3353	Multimedia Database	2	2	3	BITP 1323
BITS 2513	Internet Technology	2	2	3	
BITM 2113	Web Application Development	2	2	3	
BITP 3453	Mobile Application Development	2	2	3	
BITI 2223	Machine Learning	2	2	3	BITI 1113
BITP 2223	Software Requirement and Design	2	2	3	
BITM 2323	Digital Imaging Multimedia	2	2	3	
BITE 3633	Gameplay	2	2	3	
BITE 3713	Multi Platform Game	2	2	3	
	TOTAL			12	

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
B L HL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3,2,2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of Mathematics namely Linear Algebra and Discrete Mathematics. The topics for Linear Algebra are linear equations, matrices, determinants, vectors in Rn, real vector spaces, eigenvalues, eigenvectors, diagonalization and linear transformation. The topics for discrete Mathematics includes logic, sets, function, algorithms, integers, Mathematical reasoning, counting, Relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus And Numerical Methods (3,2,2)
Learning Outcomes

Upon completing this course, students should be able to:

1. Explain fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems.

Synopsis

This course covers two areas of Mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References

1. Varberg,D.,Purcell, E. J., and Rigdon,S.E., Calculus 9th Edition, Pearson 2007
2. James Stewart, Calculus, Thomson, 2003.
3. Johnston, E.H., Mathews J.C., Calculus, Pearson Education, 2002.
4. Atkinson, K. and Han, W., Elementary Numerical Analysis, John Wiley & Sons, Inc., 2004.
5. Richard L.B. and Faires, D.J., Numerical Analysis, Thomson, 2004.

BITI 2233 Statistics and Probability (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the concepts of fundamental Statistics and probability.
2. Solve problems in Statistics inference related to hypothesis test using software.
3. Solve application problems using appropriate Statistics techniques.

Synopsis

Students will be introduced to the concept of probability and inferential Statistics. The course starts with Probability followed by Discrete Random Variables, Continuous Random Variables and Sampling Distribution. The main topics for Inferential statististics are Estimation, Hypothesis Testing, Estimation and Hypothesis Testing: Two Populations, Anova, Simple Linear Regression and CorRelations. This course will also provide the students with some exposure to Statistical software.

References

1. Tay,c.c , Hamzah,Sek.Y.W, Law. C.Y, Review On Statistics , 2011.

2. Douglas C. Montgomery, George C.Runger, Applied Statistics and Probability for Engineers, 5th Edition, 2010, John Wiley.

3. Richard A. Johnson, Probability and Statistics for Engineers, 8th Edition, 2010, Pearson Prentice Hall.

4. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, 2011 Thomson – Duxbury.

5. Sh. Sara, Hanissah, Fauziah, Nortazi, A Module of Statistics & Probability (2nd Edition), 2007.

BITP 1113 Programming Technique (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), “Starting Out with C++: Early Objects: International Version 7th Edition”, Pearson Education International.

2. Gaddis, T., (2012), “Starting Out with C++: From Control Structures Through Objects 7th Edition”, Pearson Education International.

3. Malik, D.S (2011), “C++ Programming from Problem Analysis to Program Design 5th Edition”, Cengage Learning.

4. Liang, Y. D.(2010), “Introduction to Programming with C++ 2nd Edition”, Pearson Education International.

5. Friedman, Koffman (2011), “Problem Solving, Abstraction and Design using C++ 6th Edition”, Pearson.

BITP 1123 Data Structure and Algorithm (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation.
2. Apply the suitable data structures for an application that requires data structures.
3. Construct the data structures and algorithms in problem solving.

Synopsis

This course introduces the students to data structures and algorithms. The basic concepts in structure, class, array and pointer are discussed in order to understand the fundamental of data structures and algorithms. The course focuses on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics cover the algorithms. This also includes the algorithm efficiency for run time. Pseudo code and C++ programming language will be used in algorithm implementation. Apart from the theory, the students are asked to apply the data structures and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "C++ Programming: Program Design Including Data Structures". 7th, edition, Cengage Learning, 2014.
2. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++",4thEdition, Addison Wesley, 2011.
3. Michael T. Goodrich, Roberto Tamassia& David M. Mount,"Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.
4. Goodrich, M. T.,Tamassia, R. and Mount, D. M. (2011).Data structures and algorithms in C++.2nd edition, Hoboken, NJ, Wiley.
5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITM 2313 Human Computer Interaction (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (4th Edition), John Wiley & Sons, 2015.
2. Alan Dix et al., Human-Computer Interaction (3rd Edition), Prentice Hall, 2005.
3. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.
4. Pepin Van Roojen et al, Sign and Symbols, The Pepin Press 2006.
5. Tom Frase et al, The Complete Guide To Colour, ILEX Press Limited, 2004.
6. Geri Hay et all, Activity-Centered Design: An Ecological Approach to Designing Smart Tools and Usability Systems, The MIT Press, 2004

BITP 1323 Database (3,2,2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA).
2. Construct a relational database according to user requirements.
3. Solve simple and complex queries using Structured Query Language.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.
4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 3113 Object Oriented Programming (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the Relationship among classes.
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design .
3. Perform implementation of classes and Methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs .

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object
oriented programming basic structures, GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop a complete Java applications with database.

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.

4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 2213 Software Engineeering (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Apply the concept of software engineering for system development.
2. Explain the principles and practices of software engineering in the system development.
3. Follow the standard guideline to produce formal specifications and software modeling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Sommerville, I., Mac 2015, Software Engineering, 10th Edition, Addison-Wesley.
2. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.
3. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.
4. Chemuturi, M. And Caghley, T. M. J., 2010, Mastering Software Project Management: Best Practices, Tools and Techniques, J. Ross Publishing.
5. Bruegge, B. and Dutoit, A. H., 2010, Object-oriented Software Enginering: Using UML, patterns and Java, Prentice Hall
6. Pressman, Roger S., 2010, Software Engineering: A Practitioner's Approach, Seventh (7th) Edition, McGraw-Hill.
7. Ahmad, S. et al, (2013), A Student's Guide: UML for Software Engineering, Penerbit UTeM.

BITS 1123 Computer Organization and Architecture (3,2,2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain computer architecture and organization concept including functional components, characteristics, performance and the detailed interactions in computer system including system bus, different types of memory and input/output and CPU.
2. Extend basic of logic circuits and its application in digital systems.
3. Use instruction set design and its application in microprocessor architecture.
4. Demonstrate the ability to assemble basic computer component.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input/Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013. Computer Organization and Design: The Hardware/Software Interface, 5th Edition. Morgan Kauffman.
2. Linda Null and Julia Lobur(2014). The Essentials of Computer Organization and Architecture, 4th Edition. Jones & Bartletts Pub.
3. Aslinda, Fahmi, Nurul Azma, Zakiah and Zurina. Lecture Slides: Computer Organization & Arcitecture. Second Edition

4. Syarulnaziah, Zakiah, Marliza., Aslinda. Lab Module: Computer Organization and Architecture With MIPS Programming.

5. William Stallings, (2013). Computer Organization and Architecture, 9th Edition. Pearson.

6. Andrew S. Tanenbaum, (2013). Structured Computer Organization 6th Edition. Prentice Hall.

7. Irv. Englander (2014).The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.John Wiley & Sons.

BITS 1213 Operating System (3,2,2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Understand the basic concepts, theory and technology used in operating system.
2. Elaborate the major components and functionalities of an operating system.
3. Demonstrate basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.

2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed., Addison-Wesley.

3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.

4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.

5. Md Shah, W., Anawar, S., and Zakaria, NA., (2016). Ubuntu: Guide for Basic Administration, Module 23, Penerbit Universiti, UTeM.

6. www.ubuntu.com

BITS1313 Data Communication and Networking (3,2,2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Demonstrate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understand the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry.

References

1. orouzan, Behrouz A., 2012. Data Communications and Networking, 5th Edition, McGraw-Hill.

2. William Stallings, 2011. Data and Computer Communications, 9th Edition, Pearson.

3. Massoud Moussavi, 2011. Data Communication and Networking: A Practical Approach, 1st Edition, Cengage Learning.

4. Shashi Banzal, 2007. Data and Computer Network Communication, Firewall Media.

5. Bahaman, Nazrulazhar, Hamid, Erman and Mat Ariff, Azman, 2008. Data Communications and Networking: Practical Approach, 1st Edition, Venton.

BITM 1113 Multimedia System (3,2,2)

Learning Outcomes

After completing this subject, students will be able to:

1. Interpret the core concept of multimedia elements (C2, P1).
2. Construct multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs (C3, LL2).
3. Demonstrate problem solving skills for multimedia project development (P2, A1, CTPS1).

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D/3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communcation skills while performing their various tasks and project. Cooperative Learning (CL), Problem Based Learning (PBL), Cooperative Learning and Collaborative Learning approach will be used to enhance students capability such as competency, attitude, knowledge and communication skills.

References

1. Norasiken, B., Huoy, C. Y., Mohamad Lutfi, D., Farah, N. A. & Ahmad, N. C. P., (2014), Multimedia System, University Technical Malaysia Melaka, Module.

2. Vaughan, T., (2014), Multimedia: Making It Work 8th Edition (Ninth Edition), McGraw-Hill Osborne Media.

3. Philips, R., (2013), The Developer's Handbook to Interactive Multimedia, Routledge – Taylors & Francis Group.

4. Burg, J., (2009), The Science of Digital Media, Prentice Hall.

5. Li, Z., Drew, M. S., and Liu, J., (2014) Fundamental of Multimedia (Second Edition), Springer.

6. MOOC BITM 1113 UTeM Open Learning (https://www.openlearning.com/utemmooc)

BITI 1113 Artificial Intelligence (3,2,2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the basic definition of artificial intelligence.
2. Identify the types of artificial intelligence techniques.
3. Use the artificial intelligence techniques in problem solving.

Synopsis

Students will be exposed to the basic and branches of Artificial Intelligence (AI) such as various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. This course also covers some applications of AI
including game playing, expert systems, machine learning, and natural language processing.

References

1. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.

2. Ben Coppin, (2004), Artificial Intelligence Illuminated, Jones & Bartlett Publishers.

3. Russel, S & Norvig, P. (2009). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.

4. Luger, G. F & Stubblefield, W.A. (2002). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 4th Edition, Addison Wesley.

BITU 2913 Workshop I (3,0,9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually.
2. Identify and solve problems in systematic way.
3. Defend while presenting result of the project.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. Workshop 1 is also functioned as the platform to prepare the students for their industrial training program.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.

2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son.

3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.

4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.

5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3,0,9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project
scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6,0,24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives.
2. Practise the knowledge and skills that they have learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.
4. Report technical tasks performed into a technical journal.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6,0,24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Report on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3,0,25)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review.
2. Develop project using an appropriate method.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and
data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3,0,25)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has potential commercial value.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

COURSE CORE SUBJECTS

BITM 1123 Interactive Media Authoring (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain theories and knowledge of various interactive media applications using the multimedia authoring tools based on industrial requirements.
2. Demonstrate a systematic approach in developing interactive application for different multimedia domains and users.
3. Build interactivity in multimedia application based on the current authoring tools used by the industry.

Synopsis

This subject will introduce the various stages of interactive media project development from definition to the delivery of a multimedia product. The students will be introduced to instructional design followed by different stages in the product development including learning objects including prior analysis, the design, delivery considerations and evaluation. The lessons will also cover different models in instructional design, e-learning standards and concept of interactivity. Lab sessions will cover tools that assist the development on an interactive learning product including iBook Author and Unity. A complete project and report has to be submitted at the end of the semester.

References

1. Ahmad Shaarizan Shaarani, Emaliana Kasmuri, Nurulfajar Abd Manap and Juffrizal Karjanto. (2014). Widgetry Basics for i-Book Module, Penerbit UTeM, 2014.

2. Norasiken Bakar & Faaizah Shahbodin. (2012). Adobe flash CS5 Professional Includes Exercise Files and Training Videos. Penerbit UTeM, 2012.

3. Farah Nadia Azman. (2011). Interactive Media Authoring Lab Module, Penerbit UTeM.

4. Blaire and Preston. (2009). Cartoon Animation (The Collector's Series), Walter Foster.

5. Nellie McKesson and Adam Witwe. (2012). Publishing with iBooks Author, O'Reilly Media, Inc.

6. Michael Garofalo. (2012). The Unofficial GameSalad® Textbook, Photics.

7. Ryan Henson Creighton. (2010). Unity 3D Game Development by Example, Beginner's Guide, Packt Publishing.

8. Ryan Henson Creighton. (2013). Unity 4. X Game Development by Example, Packt Publishing.

BITM 2123 Digital Audio and Video Technology (3, 2, 2)

Learning Outcomes

Upon completion of this course, students should be able to:

1. Explain and apply the knowledge and principles of digital audio and video in computer games environment.
2. Demonstrate advanced skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Choose and organize audio video software and hardware in the conducive production environment with the latest and relevance information.

Synopsis

This course will give details and valuable insights of digital audio and video production. Throughout the semester, students will be introduced to relevant topics on digital audio and video hardware, the art of audio production, recording techniques, video production, the integration of other media in video product, implementing special effects, and storyboarding. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References

1. Burdea, G. C. & Coiffet Philippe. (2003). Virtual Reality Technology. 2nd edition. Wiley-interscience.

2. Ames, A. L., Nadeau, D. R. & Moreland, J. L. (1997). The VRML 2.0 Sourcebook. John Wiley & Sons, Inc.

3. Tony Parisi (2015). Learning Virtual Reality. O'Reilly.

4. [Tony Mullen (2011). Prototyping Augmented Reality. John Wiley & Sons.

5. Tony Parisi (2012) WebGL: Up and Running. O'Reilly.

BITM 2213 Computer Animation (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Apply basic animation techniques and production.
2. Explain the concepts of 3D modeling used in computer animation.
3. Reproduce a short 3D animation using suitable modeling software.

Synopsis

This course is designed to provide a platform where comprehensive 3D modeling and animation skills are introduced to all the students. The topics are Introduction To Animation, Introduction To Computer Graphics and 3D, Introduction To Maya, Modeling In Maya, Principles Of Animation, Physics In 3D, Mapping and Texturing, Lighting and Shadows Studies, Camera and Rendering, Animation In Maya, Maya Paint Effects, Dynamics In Maya, Rigging, Deformers and Blendshape and Lip Sync Techniques.

References

1. Dariush Derakhshani, (2015) Autodesk 3ds Max 2016 Essentials, Sybex Andy Beane, (2012) 3D Animation Essentials, Sybex

2. Tina O'Hailey (2013) Rig it Right! Maya Animation Rigging Concepts (Computers and People), Focal Press

3. Jeremy Birn (2013), Digital Lighting and Rendering (3rd Edition) (Voices That Matter), New Riders.

4. Liz Blazer (2015), Animated Storytelling: Simple Steps for Creating Animation and Motion Graphics, Pearson Education.

BITM 3133 Computer Games Development (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the principles, basic interface design and the technologies behind the rules to play a game.
2. Show how the functions of a computer games can be used to create experience including rules design, game mechanic, game balancing and social game integration into game experience.
3. Apply problem solving skills in planning and developing a computer game project.

Synopsis

This course is conducted to give an exposure to students with regards to core concepts of computer games design and games technology. The topics which the students will learn include the game comcepts, character development, creating the user experience, game balancing as well as the game genre such as action games, adventure games, puzzle games and construction management games.

References

1. Adams, E. (2010). Fundamentals of Game Design (2nd Edition). New Riders.
2. Rodgers, S. (2010). Level Up!: The Guide to Great Video Game Design. Wiley.
3. Thorn, A. (2010). Game Engine Design and Implementation. Jones & Barlett Publisher.
4. Fulton, J. and Fulton, S. (2010). Flash Games: Building Interactive Entertainment with ActionScript 3.0.
5. Feronato, E. (2011). Flash: Game Development by Example. Packt Publishing

BITM 3113 Interactive Media Project Management (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Apply techniques to evaluate project risk analysis, schedule development, cost estimation, cost and quality controls, planning purchases and acquisitions.
2. Analyze the best integration of scopes, time, cost and resources for an interactive media project management plan.
3. Show leadership skills, professional ethics and moral in managing a group project.

Synopsis

This subject emphasizes on theory, application and practice in managing a multimedia and information technology based projects. Students will learn the application of nine knowledge areas of project management, the skills required in project management, and the application of tools and techniques to an interactive media project activities to meet project requirements. In groups, students are required to practice the key competencies that project managers must develop, and prepare project management documentations for an interactive media project.

References

1. Schwalbe, K., Managing Information Technology Project (6th Edition), Cengage Learning, 2011.
2. England, E. and Finney, A., Managing Interactive Media Companion Website (4th Edition), Addison Wesley, 2007. ISBN-13:9780273712824.
3. Tay Vaughan, Multimedia: Making It Work 8th Edition. McGraw-Hill Osborne Media, 2011.

BITM 3213 Interactive Computer Graphics (3, 2, 1)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Apply the knowledge and concept of computer graphic application in 2D and 3D objects and image development.
2. Solve a computer graphic problem with selected technique and Methods using OpenGL graphic application.
3. Select a suitable technique from relevance information to solve a computer graphic application.

Synopsis

This course is to expose the students to the basic concept and digital graphic technology. This includes understanding and designing aspects by using a computer graphics application. The students will be exposed to the skill of using a computer graphics application such as OpenGL. It also emphasizes on the latest graphics design context which will focus on the 'graphic thinking' and 'creative design processes.

References

1. Edward Angel & Dave Shreiner (2012), Interactive Computer Graphics: A Top-down Approach With Shader-based OpenGL (6th edition), Pearson.

2. Richard S. Wright, Jr. et. al, (2010), OpenGL Superbible (5th edition), Addison Wesley.

3. Edward Angel, (2009), Interactive Computer Graphics: A Top Down Approach Using OpenGL. (5th edition), Addison Wesley.

4. F.S.Hill. (2007), Computer Graphics Using OpenGL. (3rd edition), Prentice Hall.

5. Donald Hearn & M. Pauline Baker, (2004), Computer Graphics with OpenGL (3rd editing). Prentice Hall.

6. Mason Woo, et. Al, (1999). OpenGL Programming Guide.(3rd edition), Addison-Wesley.

7. Alan Watt. (2000). 3D Computer Graphics (3rd edition), Addison-Wesley.

8. Mark J. Kilgard. (1996). The OpenGL Utility Toolkit (GLUT) :Programming Interface, Silicon Graphics, Inc.

9. website : HYPERLINK "http://www.opengl.com" www.opengl.com

BITM3223 Virtual Reality Technology (3.2.2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define how virtual environment works
2. Demonstrate and reproduce the techniques in computer graphics that is related to virtual reality aspect.
3. Assess the issues in generating the virtual environment with taking into account the human factor and predict the potential of virtual reality and its constraint.

Synopsis

This programme will introduce students to the technologies and techniques used in virtual reality (VR) which is also known as virtual environments the students will gain knowledge about the history of VR, latest innovations and some understanding of the important research issues and methodologies in VR. The students have the opportunity to gain practical experience using the hardware and software to create VR applications.

References

1. Burdea, G. C. & Coiffet Philippe. (2003). Virtual Reality Technology. 2nd edition. Wiley-interscience.

2. Tony Parisi (2015), Learning Virtual Reality, O'Reily.

3. Ames, A. L., Nadeau, D. R. & Moreland, J. L. (1997). The VRML 2.0 Sourcebook. John Wiley & Sons, Inc.

4. Tony Mullen (2011), Prototyping Augmented Reality, John Wiley & Sons, Inc.

5. Tony Parisi (2012) WebGL: Up and Running. O'Reily.

BITS 3423 Information Technology Security (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:
1. Describe the concept, ethics and issues in internet technology security.
2. Identify the suitable components in providing security services and mechanism in computer software, operating system, and database and network system.
3. Implement an appropriate security system mechanism.

Synopsis

Security in Information Technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this subject, student will be able to learn security services that covered Confidentiality, Integrity and
Availability (CIA) in ICT based system. This subject also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

1. Michael Goodrich, and Roberto Tamassia (2010), Introduction to Computer Security, Addison Wesley, ISBN 9780321512949.

2. W. Stallings (2010). Network Security Essentials: Applications and Standards, 4th edition, Prentice Hall, Inc, ISBN 978-0136108054.

3. D. Gollmann (2011). 3rd Edition, Computer Security, John Wiley & Sons, Inc, ISBN 978-0470741153

4. R. Bragg (2012). Certified Information systems Security Professional Training Guide, Que Certification, ISBN 0-7897-2801-x.

ELECTIVE SUBJECTS

BITE 3623 Motion Graphics (3, 2, 2)

Learning Outcomes
Upon completing this subject, students should be able to:
1. Apply the knowledge and concepts of visual effects and motion graphics development.
2. Reproducing the visual effects for motion graphics using the appropriate application.
3. Selecting the appropriate approach from a variety of sources of information to apply visual effects and motion graphics in computer games.

Synopsis

This course introduces students to the basic of visual effects and motion graphics. This includes understanding and the design by using any visual effects and motion graphics application. Students will be provided with skills in using visual effects and motion graphics such as After Effects.

References

1. T. Meyer & C. Meyer, (2008), Creating Motion Graphics with After Effect, Focal Press.

2. C. Fahs & L. Weinman. (2007), Adobe After Effect 7 Hands-On Training, Peachpit Press.

3. M. Christiansen, (2009), Adobe After Effects CS4 Visual Effects and Compositing Studio Technique. Peachpit Press.

4. T. Meyer & C. Meyer, (2009), After Effects Apprentice, Focal Press

BITP 2223 Software Requirement and Design (3, 2, 2)
Learning Outcomes

Upon completing this subject, students should be able to:
1. Analyze software requirement and design the software using object oriented approach and UML.

2. Model software analysis, software requirement and software design using object oriented approach supported by case tool, StarUML.
3. Identify and solve common design problem using Design Pattern concept.

Synopsis

This course introduces the student to the object oriented approach using UML such as object-oriented concept, object oriented application development life cycle, UML history and notation, comparison between OOAD and SDM and introduction to object and class.
This course includes the use-case model to capture the requirement using use case diagram and use case description. They will learn to identify the uses cases, actors, perform analysis modeling sing dynamic or static diagram such as activity diagram, sequence diagram, collaboration diagram and class diagram.

References

1. Karl Wiegers, Joy Beatty, Software Requirements, Third Edition, Microsoft, 2013.

2. Alan Dennis, Barbara Haley Wixom and David Tegarden, System Analysis and Design with UML: An Object-Oriented approach 3rd Edition, Wiley 2010

3. Mohd Khanapi Abd Ghani, and Sufian Sulaiman, Lab Module - Software Requirement Analysis and Design: Object-oriented approach with UML.Penerbit UTeM, 2011

4. Martin Fowler, UML Distilled Third Edition A Brief Guide to the Standard Object Modeling Language, Addison Wesley 2012
5. Ian Sommerville, Software Engineering 6th Edition, Addison Wesley 2012

6. Cay Horstman, Object Oriented Design and Patterns, John Wiley and Sons 2012

7. Alan Shalloway, James Trott Design Patterns Explained: A New Perspective on Object-Oriented Design, 2/E, Addison-Wesley Professional, 2012

8. Jim Arlow, Ila Neustadt UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2/E, Addison-Wesley Professional, 2012

BITP 3353 Multimedia Database (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:
1. Explain the fundamental concept of multimedia database and its requirements.
2. Demonstrate understanding in dealing with various multimedia data types.
3. Apply the multimedia database design concept in storing and retrieving multimedia data.

Synopsis

Multimedia Database Management System (MDBMS) is a DBMS that support traditional and multimedia data types. The DBMS is able to handle large cluster of multimedia entities. This subject covers main components that need to be integrated into conventional DBMS for practical usage in multimedia application development. This includes an overview of multiple features and approaches in handling large cluster of multimedia entities by current DBMS. Consequently, a set of features and functionalities needed by an MDBMS to support various multimedia data types effectively and efficiently is being developed.

References

1. Dunckley, L. (2003) Multimedia Databases: An Object-Relationsal Approach UK : Pearson.

2. Candan, K.S. and Sapino, M.L. (2010), Data Management for Multimedia Retrieval. Cambridge University Press.

3. Lu, G. (1999), Multimedia Database Management Systems, UK.

4. Rob, P. & Coronel, C. (2004) Database Systems : Design, Implementation, and Management 6th Edition Course Technology

5. Subrahmanian, V. S. 1998. Principles of Multimedia Database Systems, Morgan Kaufmann.

BITM 3413 Geographical Information System (GIS) (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Show and explain the concepts, issues, techniques and various GIS applications.
2. Solve information system problems based on the GIS language technique.
3. Justify the issues in GIS management based on the information from various resources.

Synopsis

This course will introduce students to Geographical Information Systems (GIS). GIS is a computer based data processing tool that is used to manage, analyse and visualise spatial data. It can be considered as advanced database. Students will explore some of the GIS applications in in the area of electronic government, resources management, disaster management, businesses, banking and insurance industries. Students must be familiar with traditional Methods of identifying and describing locations using paper maps. The students will begin by examining the Geographical basics of mapping and examine the processes in which spatial data can be recorded, captured, stored, processed using computers. Next, the students will introduce the Methods used in spatial analysis. The final portion of the course will focus on spatial cartographic presentation of data.

References

1. Paul A. Longley (2010).Geographic Information Systems and Science 3 edition. Wiley;

2. Chang, Kang-tsung (2011), Introduction to Geographic Information Systems, McGraw-Hill, 6nd Edition,

3. Maribeth Price (2011). Mastering ArcGIS 5 edition. McGraw-Hill.

4. Tim Ormsby, Eileen J. Napoleon (2010). Getting to Know ArcGIS Desktop Second Edition. ESRI Press.

BITS 2513 Internet Technology (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Apply the system requirements align with the current technology advancement.
3. Demonstrate the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web based knowledge also contribute to this phenomenon. Hence, this course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study including basic concepts of client and server, networking, Internet Security and its application.

References

1. Jean Andrews, Wally Beck (2004). i-Net Guide to the Internet. 3rd Edition, Cengage Learning.

2. Douglas E. Comer (2007). The Internet 4th edition. Pearson Prentice Hall.

3. Fred T. Hofstetter (2005), Internet Technologies at Work, McGraw Hill Technology Education

4. Douglas E. Comer (2004), Computer Networks and Internets with Internet Applications 4th Edition, Pearson Prentice Hall.

5. Brian Williams, Stacey Swayer (2010). Using Information Technology 9e Complete Edition. Career Education.

6. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing

BITM 2113 Web Application Development (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Discuss the concept and the principle of Internet and WWW based on the latest technologies.
2. Use the important component in web application development which are Client Site Technology, Server Site Technology, Database Server and Web Server.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are:

- Client Site Technologies: HTML, CSS, XML, and JavaScript
- Server Site Technologies: PHP
- Database Server: MySQL.
- Web Servers: Apache

References

1. Robert W.Sebesta (2015), Programming The World Wide Web – 8th Edition, Pearson, ISBN: 0133775984

2. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5) 4th Edition. O'Reilly Media. ISBN-13: 978-1491918661.

3. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.

4. Keith Darlington (2005), Effective Website Development – Tools and Techniques, Addison Wesley, ISBN: 0-321-18472-6

5. Luke Welling, Laura Thomson (2008), PHP and MySQL Web Development – 4th Edition, Addison-Wesley, ISBN: 0672329166

BITP 3433 Mobile Application Development (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Identify the suitable mobile applications at both technical and business levels (A2, ES).
2. Select the suitable component to develop the mobile application (C4, CTPS).
3. Develop a mobile application that is best suited for the emerging mobile device using an appropriate software development environment (P3, TS).

Synopsis

This course aims to prepare students to work in the area of mobile software development. The course introduces the student to the relevant technologies and equips them with skills in the design and development of mobile applications using up-to-date software development tools and APIs. The content of the course emphasis on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices.

References

1. Dudney, B. and Adamson, C. iPhone SDK Development (The Pragmatic Programmers). Pragmatic Bookshelf, 2009.

2. LaMarche, J. and Mark, D. Beginning iPhone 3 Development: Exploring the iPhone SDK. Apress, 2009.

3. Pilone, D. and Pilone, T. Head First iPhone Development: A Learner's Guide to Creating Objective-C Applications for the iPhone. O'Reilly Media, 2009.

4. IPhone Development Guide Tools & Languages: IDEs. Apple Inc. , City, 2010

5. Brian Fling, 2009, Mobile Design and Development, O'Reilly,

6. Delessio, Darceyl, Conder, 2013, Android Application Development in 24 Hours 3rd Edition, SAMS

BITI 2223 - Machine Learning (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Differentiate the fundamental concept of machine learning theory.
2. Select the appropriate techniques in machine learning problem solving.
3. Demonstrate machine learning algorithm based on machine learning concepts.

Synopsis

The course aims to provide exposure on the foundation of machine learning, which is the study of how to build a computer system that learns from experience. The course starts with an overview of Data Mining for a background study. Main topics that will be covered are such as concept learning, decision tree learning, Bayesian learning, instance-based learning, learning sets of rules, and reinforcement learning. Besides, some applications of machine learning including robotic control, autonomous navigation, bioinformatics, speech recognition, and web data processing will be introduced.

References

1. Witten, I.A., Frank, E., (2011), Data Mining: Practical Machine Learning and Techniques (Third Edition), Morgan Kaufmann.

2. Stephen Marsland (2009), Machine Learning: An Algorithmic Perspective, Chapman & Hall/Crc Machine Learning & Pattern Recognition

3. Barber D., (2012), Bayesian Reasoning and Machine Learning, Cambridge University Press.

4. Alpaydin, E., (2009), Introduction to Machine Learning, The MIT Press.

BACHELOR OF COMPUTER SCIENCE (COMPUTER NETWORKING) WITH HONOURS

COURSE LEARNING OUTCOMES

A bachelor's degree course in Computer Science, B.Sc.(Computer Networking) (Honours) is aimed to produce highly knowledgeable and skillful graduates in the field of information technology and communication. Graduates are competent in advanced specialized knowledge and skill in analyzing, developing, installing, administrating, servicing, and controlling the networking system and communication.

LEARNING OUTCOMES

The aim of FTMK bachelor's degree program is to produce students with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to analyze, create, assemble, configure, implement, manage, maintain and administer network infrastructure and security.
iv. Able to develop advanced computer network applications.
v. Able to obtain recognition from professional bodies.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

The graduates can be employed in the government and private sectors as well as undertaking business ventures of their own. The positions suitable for the graduates including Information System Executive, System Analyst, Computer Security Executive, Network Project Administrator, Network Programmer and Network Engineer. Graduates are also have the opportunity to continue their studies in master and PhD level.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Computer Networking) degree. The programme components as follows:

Component Credit Hours
University Compulsory Subjects 18
Program Core Subjects 66
Course Core Subjects 24
Elective Subjects 12
TOTAL 120

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations– TITAS
BLHW 2 712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English for Professional Communication
**BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (66 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITP 1113	Programming Technique
BITP 1123	Data Structure and Algorithm
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITP 3113	Object Oriented Programming
BITP 2213	Software Engineering
BITS 1123	Computer Organization and Architecture
BITS 1213	Operating System
BITS 1313	Data Communication and Networking
BITM 1113	Multimedia System
BITI 1113	Artificial Intelligence
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II

COURSE CORE SUBJECTS (24 credits)

BITS 2313	Local Area Network
BITS 2323	Wide Area Network
BITS 2333	Network Analysis and Design
BITS 3313	Network Administration and Management
BITS 3323	Network Project Management
BITS 3333	Multimedia Networking
BITS 3413	IT and Network Security
BITS 3513	TCP/IP Programming

ELECTIVE SUBJECTS (12 credits)

Choose any 4 (FOUR) from the following.

BITS 3343	Fiber Optic
BITM 1123	Interactive Media Authoring
BITM 2123	Digital Audio and Video Technology
BITS 3533	Wireless Network & Mobile Computing
BITS 3443	Digital Forensics
BITS 2513	Internet Technology
BITM 2113	Web Application Development

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW1702	Islamic and Asian Civilizations	2	0	2	
BLHW 2712	Ethnic Relations	2	0	2	
BITI 1213	Linear Algebra and Discrete Mathematics	2	2	3	
BITP 1113	Programming Technique	2	2	3	
BITS 1123	Computer Organization and Architecture	2	2	3	
BITM 1113	Multimedia System	2	2	3	
Total				16	

Note: 1. BLHW 1702 Islamic and Asian Civilizations (local) is replaced with BLHW 1942 Malaysia Studies for International students.
2. BLHW 2712 Ethnic Relations replace with BLHW 2752 Malaysian Culture (for international students).

Year One (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW2403	Technical English	3	0	3	
BITI 1223	Calculus and Numerical Methods	2	2	3	
BITP 1123	Data Structure and Algorithm	2	2	3	BITP 1113
BITS 1313	Data Communication and Networking	2	2	3	
BITM 2313	Human Computer Interaction	2	2	3	
BITP 1323	Database	2	2	3	
Total				18	

Year Two (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English for Professional Communication	3	0	3	
BITU2913	Workshop I	0	9	3	BITP 1113
BITI 2233	Statistics and Probability	2	2	3	
BITS 2313	Local Area Network	2	2	3	BITS 1313
BITS 1213	Operating system	2	2	3	
BITP 3113	Object Oriented Programming	2	2	3	BITP 1123
Total				19	

Year Two (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum I**	0	3	1	
BLHC 4032	Critical and Creative Thinking	2	0	2	
BITP 2213	Software Engineering	2	2	3	
BITS 2333	Network Analysis and Design	2	2	3	BITS 2313
BITI 1113	Artificial Intelligence	2	2	3	
BITS 2323	Wide Area Network	2	2	3	BITS 2313
BIT- ----	Elective 1	2	2	3	
Total				18	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.

Year Three (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum II**	0	3	1	
BLHL ----	Third Language	1	2	2	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITS 3313	Network Administration and Management	2	2	3	BITS 2333
BITS 3323	Network Project Management	2	2	3	
BIT- ----	Elective II	2	2	3	
BIT- ----	Elective III	2	2	3	
Total				18	

Year Three (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BTMW 4012	Technology Entrepreneurship	2	0	2	
BITS 3333	Multimedia Networking	2	2	3	BITS 2313
BITS 3513	TCP/IP Programming	2	2	3	BITP 1113
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BIT- ----	Elective IV	2	2	3	
BITS 3413	Information Technology and Network Security	2	2	3	BITS 1213, BITS 1313
Total				17	

*Equivalent to 25 hours of Self-Learning Time

Year Three (Special Semester)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
Total				3	

*Equivalent to 25 hours of Self-Learning Time

Year Four (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	BITU 3983
BITU 3946	Industrial Training Report	0	24	6	BITU 3983
Total				12	

Note: requisite (completed all subject + muet band 2)

Elective Subjects

Below is a list of elective subjects can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subject given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITS 3343	Fiber Optic	2	2	3	BITS 1313
BITM 1123	Interactive Media Authoring	2	2	3	
BITM 2123	Digital Audio and Video Technology	2	2	3	
BITS 3533	Wireless Network and Mobile Computing	2	2	3	BITS 1313
BITM 2113	Web Application Development	2	2	3	
BITS 2513	Internet Technology	2	2	3	
BITS 3443	Digital Forensics	2	2	3	

List of elective subjects offered will be modified from time to time in accordance with industry needs.

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
B L HL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completion this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Discrete Mathematics. Topics for Linear Algebra include linear equations, matrices, and determinants, vectors in R^n, real vector spaces, eigenvalues, linear transformation, and introduction to linear programming. Topics for discrete mathematics consist of logics, sets, function, algorithms, integers, mathematical reasoning, counting, relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus and Numerical Methods (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems

Synopsis

This course covers two areas of mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part topics consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References

1. Atkinson, K. and Han, W., 2004. *Elementary Numerical Analysis, 3rd* Ed., New York: John Wiley & Sons.
2. Atkinson, K., Han, W. Stewart, D.E., 2009. *Numerical Solution of Ordinary Differential Equations*., New Jersey: John Wiley & Sons.
3. Faires, J.D. and Burden, R.L., 2011. *Numerical Analysis*, 9th Ed., Boston: Brooks/Cole.
4. Fowler, J. and Snapp, B., 2014. *MOOculus Calculus* [online] Available at: https://mooculus.osu.edu [Accessed on 28 January 2015].

5. Heinbockel, J.H., 2012. *Introduction to Calculus* [online] Available at www.math.odu.edu/~jhh/Volume-1.PDF [Accessed on 28 January 2015].
6. Varberg,D., Purcell, E. J., and Rigdon,S.E., 2007. *Calculus,* 9th Ed., New Jersey: Pearson Education.

BITI 2233 Statistics and Probability (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate understanding of the concept and fundamentals of statistics and probability.
2. Reproduce solutions for application problems using statistical software.
3. Solve application problems using appropriate statistical techniques.

Synopsis

This course will provide a comprehensive introduction to statistics and probability for computer science students. Topics that will be covered in this course include data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distribution. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing, estimation and hypothesis testing for two populations, simple linear regression and correlation, and one-way ANOVA. In this course, students are guided to use statistical software to perform descriptive and inferential statistics analysis

References

1. Navidi, W., (2014), "Statistics for Engineers and Scientists", 4th Edition,McGraw-Hill Education.

2. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), "Probability and Statistics for Engineers & Scientist", 9th Edition, Pearson Educational International.

3. Devore, J. L., (2011) "Probability and Statistics for Engineering and the Sciences", 8th Edition, Thomson.

4. Montgomery, D. C., Runger, G. C.,(2011), "Applied Statistics and Probability for Engineers", 3rd Edition, John Wiley.

5. Johnson, R., Freund, J., Miller, I., (2011), "Probability and Statistics for Engineers, 8th Edition", Pearson Educational International.

6. Mann, P. S., (2013), "Introductory Statistics", 8th Edition, Wiley.

7. Sh. Sara, Hanissah, Fauziah, Nortazi, Farah Shahnaz (2008), "Introduction to Statistics & Probability A Study Guide", Pearson Educational International.

BITP 1113 Programming Technique (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications

2. Construct computer program codes by applying suitable programming tools, structures and techniques.

3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.

2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures through Objects 7th Edition", Pearson Education International.

3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.

4. Liang, Y. D. (2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.

5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

BITP 1123 Data Structure and Algorithm (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation.

2. Apply the suitable data structures for an application that requires data structures.

3. Construct the data structures and algorithms in problem solving.

Synopsis

This course introduces the students to data structures and algorithms. The basic concepts in structure, class, array and pointer are discussed in order to understand the fundamental of data structures and algorithms. The course focuses on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics cover the algorithms. This also includes the algorithm efficiency for run time. Pseudo code and C++ programming language will be used in algorithm implementation. Apart from the theory, the students are asked to apply the data structures and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "C++ Programming: Program Design Including Data Structures". 7th, edition, Cengage Learning, 2014.

2. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++",4thEdition, Addison Wesley, 2011.

3. Michael T. Goodrich, Roberto Tamassia& David M. Mount,"Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.

4. Goodrich, M. T.,Tamassia, R. and Mount, D. M. (2011).Data structures and algorithms in C++.2nd edition, Hoboken, NJ, Wiley.

5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITM 2313 Human Computer Interaction (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.

2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Julie A. Jacko Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, Third Edition (Human Factors and Ergonomics), CRC Press 2012.

2. Ben Shneiderman et al, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition), 2009.

3. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (2nd Edition), John Wiley & Sons, 2007.

4. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.

BITP 1323 Database (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA).
2. Construct a relational database according to user requirements.
3. Solve simple and complex queries using Structured Query Language.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.

4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 3113 Object Oriented Programming (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the Relationsship among classes.
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.
3. Perform implementation of classes and Methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs .

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures, GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop complete Java applications with database.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.
2. Deitel, H. M. & Deitel, P. J., Java How To Program, 10th Ed., Pearson Education International, 2014.
3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.
4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.
5. Cadenhead, Rogers, Java in 24 Hours, Sams Teach Yourself (Covering Java 8) (7th Edition), SAMS, 2014.
6. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015.

BITP 2213 Software Engineering (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Apply the concept of software engineering for system development.
2. Explain the principles and practices of software engineering in the system development.
3. Follow the standard guideline to produce formal specifications and software modeling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Sommerville, I., Mac 2015, Software Engineering, 10th Edition, Addison-Wesley.

2. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.

3. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.

4. Chemuturi, M. And Caghley, T. M. J., 2010, Mastering Software Project Management: Best Practices, Tools and Techniques, J. Ross Publishing.

5. Bruegge, B. and Dutoit, A. H., 2010, Object-oriented Software Enginering: Using UML, patterns and Java, Prentice Hall

6. Pressman, Roger S., 2010, Software Engineering: A Practitioner's Approach, Seventh (7th) Edition, McGraw-Hill.

7. Ahmad, S. et al, (2013), A Student's Guide: UML for Software Engineering, Penerbit UTeM.

BITS 1123 Computer Organization and Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input / Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013. Computer Organization and Design: The Hardware/Software Interface, 5th Edition. Morgan Kauffman.

2. Linda Null and Julia Lobur(2014). The Essentials of Computer Organization and Architecture, 4th Edition. Jones & Bartletts Pub.

3. Aslinda, Fahmi, Nurul Azma, Zakiah and Zurina. Lecture Slides: Computer Organization & Arcitecture. Second Edition

4. Syarulnaziah, Zakiah, Marliza., Aslinda. Lab Module: Computer Organization and Architecture With MIPS Programming.

5. William Stallings, (2013). Computer Organization and Architecture, 9th Edition. Pearson.

6. Andrew S. Tanenbaum, (2013). Structured Computer Organization 6th Edition. Prentice Hall.

7. Irv. Englander (2014).The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.John Wiley & Sons.

BITS 1213 Operating System (3,2,2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts, theory and technology used in operating system.
2. Demonstrate the major components and functionalities of an operating system.
3. Display the basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.

2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed., Addison-Wesley.

3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.

4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.

5. Md Shah, W., Anawar, S., and Zakaria, NA., (2016). Ubuntu: Guide for Basic Administration, Module 23, Penerbit Universiti, UTeM.

6. www.ubuntu.com

BITS 1313 Data Communication and Networking (3,2,2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Build the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Manipulate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understands the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and apply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring basic computer networks using guided or unguided media.

References

1. Forouzan, Behrouz A., 2012. *Data Communications and Networking*, 5th Edition, McGraw-Hill.

2. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. *Lab Companion: Data Communications and Networking*, 1st Edition.

3. William Stallings, 2013. *Data and Computer Communications*, 10th Edition, Pearson.

4. Massoud Moussavi, 2011. *Data Communication and Networking: A Practical Approach*, 1st Edition, Cengage Learning.

5. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, *Business Data Communications and Networking*, 12th Edition, Pearson

6. Bahaman, Nazrulazhar, Hamid, Erman and Mat Ariff, Azman, 2013. *Data Communications and Networking: Practical Approach*, 3rd Edition, Venton.

7. Curt M. White, 2012. Data Communications and Computer Networks, Cengage Learning

8. Randall J. Boyle, Jeffrey A. Clements, 2013. *Applied Networking Labs,* 2nd Edition, Prentice Hall

BITM 1113 Multimedia System (3,2,2)

Learning Outcomes

After completing this subject, students will be able to:

1. Interpret the core concept of multimedia elements (C2, P1).
2. Construct multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs (C3, LL2).
3. Demonstrate problem solving skills for multimedia project development (P2, A1, and CTPS1).

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D/3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communcation skills while performing their various tasks and project. Cooperative Learning (CL), Problem Based Learning (PBL), Cooperative Learning and Collaborative Learning approach will be used to enhance students capability such as competency, attitude, knowledge and communication skills.

References

1. Norasiken, B., Huoy, C. Y., Mohamad Lutfi, D., Farah, N. A. & Ahmad, N. C. P., (2014), Multimedia System, University Technical Malaysia Melaka, Module.
2. Vaughan, T., (2014), Multimedia: Making It Work 8th Edition (Ninth Edition), McGraw-Hill Osborne Media.
3. Philips, R., (2013), The Developer's Handbook to Interactive Multimedia, Routledge – Taylors & Francis Group.
4. Burg, J., (2009), The Science of Digital Media, Prentice Hall.
5. Li, Z., Drew, M. S., and Liu, J., (2014) Fundamental of Multimedia (Second Edition), Springer.

BITI 1113 Artificial Intelligence (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the definition of Artificial Intelligence and its techniques.
2. Classify the types of Artificial Intelligence techniques.
3. Follow the Artificial Intelligence techniques in problem solving.

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References

1. Russel, S & Norvig, P. (2010). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
2. Luger, G. F. (2015). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Pearson Education.
3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
4. Kopec, D, Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

BITU 2913 Workshop I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually.
2. Identify and solve problems in systematic way.
3. Defend while presenting result of the project.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. Workshop 1 is also functioned as the platform to prepare the students for their industrial training program.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.
2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son.

3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.

4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.

5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives.
2. Practise the knowledge and skills that they have learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.
4. Report technical tasks performed into a technical journal.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Report on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review.
2. Develop project using an appropriate method.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3, 0, 25)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has potential commercial value.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

COURSE CORE SUBJECTS

BITS 2313 Local Area Network (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts and elements of LAN and their uses.
2. Investigate the suitable hardware and software required for LAN communications.
3. Evaluate the fundamental principles that influence the selection of LAN hardware, LAN topology and LAN protocols.
4. Build the setup of a LAN and the alternatives that exist in the selection of hardware, software and transmission facilities when designing and implementing LANs.

Synopsis

This course is an introduction to the current methods and practices in the use of Local Area Networks (LANs). The emphasis will be placed on LAN hardware and software, installation management and connection to other networks. Topics covered include network architecture, network communication protocols, end-to-end protocol stacks, network components, network management and the Open Systems Interconnection (OSI) reference model.

References

1. Steve McQuerry, David Jansen, David Hucaby, Cisco LAN Switching Configuration Handbook, 2nd Edition, CISCO Press (2009), ISBN-10: 1-58705-610-0

2. Wayne Lewis, *LAN Switching and Wireless, CCNA Exploration Companion Guide (Cisco Networking Academy* Program), CISCO Press (2012), ISBN 1587132737

3. Jr. Kenneth C. Mansfield, James L. Antonakos, Computer Networking for LANs to WANs: Hardware, Software and Security (Networking (Course Technology)), Delmar Cengage Learning; 1 edition (2009), ISBN-10: 1423903161

4. James F. Kurose, Keith W. Ross, Computer Networking(Fourth Edition), Pearson Addision Wesley(2008), ISBN 0-321-51325-8

5. Behrouz A. Forouzan, Data Communications and Networking (4th Edition), McGraw-Hill Forouzan Networking Series(2006), ISBN 978-0073250328

6. William Stalling, Wireless Communications and Networks (2nd Editions), Pearson Education International(2005), ISBN 0-13-196790-8)

7. Behrouz A. Forouzan, Local Area Networks, McGraw-Hill Forouzan Networking Series(2003), ISBN 0-07-233605-6

8. Donald C. Lee, Enhanced IP Services for Cisco Networks ,Cisco Press (2002), ISBN1-57870-247-X

BITS 2323 Wide Area Network (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain about the wide area network concept and technology.
2. Identify the suitable method in selecting server, WAN devices and an appropriate network technology.
3. Demonstrate the integration of different network topology, security, and reliability and management capabilities.
4. Construct the network architecture design using structure design approach to solve wide area network problem.

Synopsis

This course introduces the concepts, practices, and technologies used in the design and implementation of Wide Area Networks. Topics will include: overview of network fundamentals, considerations for LAN and WAN implementations, network security requirement, and trends in the carrier network services. Students will also be able to understand, explain and apply the fundamentals of Wide Are Network technology concepts and skills in network applications, troubleshooting, and preparing for CCNA examinations.

References

1. Rick Graziani and Bob Vachon, 2014, Connecting Networks Companion Guide, 1st Edition, CISCO Press.

2. Patrick Regan, *Wide Area Network*, Pearson Prentice Hall, 2004, ISBN: 0-13-046578-X

3. Cisco Networking Academy, 2014, Routing and Switching Essentials Companion Guide, 1st Edition, Cisco Press.

4. Kaveh Pahlavan and Prashant Krishnamurthy, 2009, *DNetworking Fundamentals: Wide, Local and Personal Area Communications,* Wiley.

5. Douglas E. Comer, 2004, *Computer Networks and Internets with Internet Applications*, 4th edition

6. Cisco Networking Academy, 2013, Connecting Networks Lab Manual (Lab Guide), 1st Edition, CISCO Press.
7. Allan Johnson, 2014. Scaling Networks Companion Guide, 1st Edition, Cisco Press.

BITS 2333 Network Analysis and Design (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Manipulate the understanding of issues related to current computer network design, processes, tools and techniques.
2. Analyze the methodology for effective computer networking design.
3. Demonstrate the analysis and design of specific projects related to an organization proposed by students.

Synopsis

This course covers a systems approach to network design, the concept, guidelines and practice for Requirement analysis and Flow Analysis. The technology choices, interconnection

mechanism, network management and security will be covered in logical design. Some issue on network design will be included in Physical design and addressing and routing. Software for network analysis and design namely the Microsoft Visio will be introduced and used to help in understanding and applying the network analysis and design knowledge areas and processes.

References

1. Oppenheimer, P. (2011), "Top Down Network Design – Third Edition", Cisco Press, ISBN: 978-1-58720-283-4
2. Scott A.Helmers (2013). "Microsoft Visio 2013 step by step". O'Reilly Media, ISBN: 978-0-7356-6946-8.
3. J. Kurose and K. Ross. (2009). "Computer Networking: A Top-Down Approach Featuring the Internet – Fifth Edition." Addison-Wesley, ISBN: 978-0136079675
4. Kaufmann, M. and Mc Cabe, J. (2007). "Network Analysis, Architecture, and Design", Morgan Kaufman, ISBN: 978-0-12-370480-1
5. Yusof, R. (2007), "Network Analysis and Design", UTeM.
6. James D Mc Cabe. (1998), "Practical Computer Network Analysis and Design". Morgan Kaufmann, ISBN: 978-1-55860-498-8

BITS 3313 Network Administration and Management (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Categorize the standards and protocols used for network administration and management.
2. Propose suitable technique of problem solving in network administration and management.
3. Manipulate the software tools for network administration and management.

Synopsis

This course covers the topics in network administration and management, duties as network administrators/managers, host management, infrastructure components, users management, Simple Network Management Protocol, Management Information Base, Remote Monitoring, web-based management and network security management.

References

1. Douglas E Comer, Automated Network Management Systems, Publisher, Addison-Wesley, 2007
2. Alexander Clemm, Network Management Fundamentals, Cisco Press, 2006
3. Benoit Claise & Ralf Wolter, Network Management: Accounting and Performance Strategies, Cisco Press, 2007.
4. Thomas A. Limoncelli, Christina J. Hogan and Strata R. Chalup, The Practice of System and Network Administration, Second Edition, Pearson Education Inc., 2007
5. Adrian Farrel, Network Management Know It All, Morgan Kaufmann, 2008
6. Robiah Yusof, Mohd. Faizal Abdollah & Shahrin Sahib, Network Administration and Management, 2007.
7. Mani Subramanian, Network Management: Principles and Practices (2nd Edition), Prentice Hall; 2 edition, 2012
8. David D. Coleman , David A. Westcott, CWNA: Certified Wireless Network Administrator Official Study Guide: Exam CWNA-106 4th Edition, Sybex; 4 edition, 2014

BITS 3323 Network Project Management (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Manipulate the concept of network project management in term of processes, tools and technique.
2. Demonstrate the understanding of all the project management body of knowledge, processes, tools and techniques.
3. Organize projects related to information technology and specifically related to computer network.

Synopsis

This course covers project management body of knowledge (project integration management, scope management, time management, cost management, quality management, and human management). It also covers the processes or steps in project management (project initiation, planning, executing, controlling and project closing or termination). Software for project management (Microsoft Project and Microsoft Excel) will be introduced and used to help in understanding and applying the project management knowledge areas and processes.

References

1. Schwalbe, Kathy. (2013). Managing Information Technology Projects, 7th Ed. Course Technology, Cengage Learning, ISBN No. 1133526853
2. Harold Kerzner, (2009). Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Wiley; 10th edition.
3. PMI. (2008). A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – 4th Ed.
4. Douglas E. Comer. (2007). Automated Network Management System, Pearson International Edition.
5. Sazilah Salam, Nurazlina Mohd Sanusi, Fararishah Khalid, Robiah Yusof, Khadijah Wan Mohd Ghazali and Edna Buyong. Project Management. FTMK & FPTT, UTeM, 2009.

BITS 3333 Multimedia Networking (3,2,2)

Learning Outcomes

Upon completing this subjects, students should be able to :

1. Identify the suitable technique to solve networking problems related to multimedia networks.
2. Compare various concepts of data representations, compression techniques, QoS mechanisms and applications in multimedia networking.
3. Manipulate the mechanisms that support the multimedia application in multimedia networking environment.

Synopsis

This topic covers the subject-topics basic and advanced network multimedia. Certain topics will be selected from multimedia information representation, compression, network High-speed such as Frame Relay, and ATM Network Local High-Speed Computers. The emphasis will also be given to the transmission protocol (TCP / IP, RSVP, MPLS, RTP) and Quality of Service (QoS) in networks such as Intergrated Services and Differentiate Services.

References

1. Jenq-Neng Hwang (2009), Multimedia Networking: From Theory to Practice. Cambridge University Press.
2. James F. Kurose and Keith W. Ross (2012), Computer Networking: A Top-Down Approach (6th Edition). Pearson Education
3. Santiago Alvarez (2012), QoS for IP/MPLS Networks, Cisco Press.

4. W. Stallings, (2002) High Speed Networks and Internets – Performance and Quality of Service.Prentice Hall

5. F. Halsall, (2001) Multimedia Communication – Applications, Networks, Protocols, and Standards. Pearson Education

BITS 3413 IT and Network Security (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Distinguish the appropriate methods to safeguards the elements of information technology and network.
2. Build the elements in information technology and network with the appropriate methods and tools / software.
3. Explain issues related to ethics and law in information technology and networks and relate it with cyber laws in Malaysia.

Synopsis

This course covers background views of ICT threats and the needs to have theoretical security method on Information Security in Software, Operating System, Data Center, and Computer Networks. The course will also cover the basic cryptographic elements and authentication, IP Security, Firewalls, Security Management, and the related issue in Computer Crimes and Cyber Laws. Security related computing namely Microsoft Excel and Windows 2012 will be introduced and used to help in understanding and applying the security mechanism and algorithms.

References

1. Siti Rahayu, Robiah, Mohd Faizal and Nazrulazhar (2006), *Information Technology Security*, Pearson, ISBN 13 978-983-3655-47-2.

2. C.P. Pfleeger, S. L. Pfleeger (2015). *Security in computing* 5th Ed., Prentice Hall International, Inc., ISBN 0-13: 978-0134085043.

3. W. Stallings (2013). *Network Security Essentials: Applications and Standards*, 5th edition, Pearson, ISBN 0-13: 978-0133370430.

4. D. Gollmann (2011). 3rd Edition, *Computer Security*, John Wiley & Sons, Inc, ISBN 0-470-86293-9

5. James M. Stewart, Mike Chapple, Darril Gibson, (2015), *CISSP (ISC)2 Certified Information Systems Security Professional Official Study Guide 7th Edition*, Sybex, ISBN-13: 978-1119042716

6. R. Bragg (2003). *Certified Information systems Security Professional Training Guide*, Que Certification, ISBN 0-7897-2801-x.

7. Michael E. Whitman, Herbert J. Mattord, (2015), Principles of Information Security 5th Edition, Course Technology, ISBN-13: 978-1285448367

8. Mark Merkow and Jim Breithaupt (2006), *Information Security: Principles and Practices,* Pearson Prentice Hall, ISBN 0-13-154729-1.

9. Eric Maiwald and William Sieglein (2003), *Security Planning and Disaster Recovery*, McGraw Hill, ISBN 0-07-222463

10. Sean-Philip Oriyano, (2014) *CEH: Certified Ethical Hacker Version 8 Study Guide*, Wiley, ISBN: 978-1-118-64767-7

BITS 3513 TCP/IP Programming (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate various techniques and concepts of network programming.
2. Discover several common programming interfaces for network communication.
3. Manipulate advanced knowledge of programming to solve the network programming problem.

Synopsis

This subject intended to expose student on how network programming works. Since Java is one of the most demanding skill in industry, so this subject will emphasize on how to write a network programming by using Java language. This subject will show students on how to use Java's network class library to quickly and easily write programs that accomplish many common networking tasks.

References

1. Elliotte Rusty Harold, Java Network Programming 4th Edition, O'Reilly & Associates. (2013)

2. Jan Graba, An Introduction to Network Programming with Java 3rd Edition, Springer (2013)

3. Esmond Pitt, Fundamental Networking in Java, Springer (2006).

4. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSP, 2nd Edition, O'Reilly Media (2008)

ELECTIVE SUBJECTS

BITS 3343 Fiber Optic (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Illustrate the concept of fiber optic basic theories.
2. Assemble the suitable cable and network devices for fiber optic.
3. Demonstrate a network design using fiber optic cable and appropriate tools.

Synopsis

This subject covers basic and advanced applications that will relate to optical fiber in common usage in the network. Specific mechanism will be discussed from operating principles of optical communication device to fiber optic communication technology.

References

1. Norharyati H., Wahidah M. S and Marliza R., Fiber Optic Lab Companion (2014).

2. Gerd E. Keiser (2010), Fiber Optic Communications, 4st Edition, Mc-Graw Hill

3. Jeff Hecht, (2005) , Understanding Fiber Optic, 5th Edition, Prentice Hall.

4. John M. Senor (2009),Optical Fiber Communications, Principles and Practice, 3rd Edition, Prentice Hall

5. GovindP.Agrawal (2010) Fiber Optic Communication Systems, 4th Edition, John Wiley &Sons.

6. Rajiv Ramaswarmi, Kumar N. Sivarajan, Galen Hajime Sasaki, (2009),Opticals Network: A Practical Perspective, 3rd Edition

7. Jim Hayes (2010), Fiber Optics Technician's manual, 4rd Edition, Delmar Cengage Learning.

8. S. Kumar, M. Jamal Deen (2012), "Fiber Optic Communications: Fundamental and Applications"

BITM 1123 Interactive Media Authoring (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain theories and knowledge of various interactive media applications using the multimedia authoring tools based on industrial requirements.
2. Demonstrate a systematic approach in developing interactive application for different multimedia domains and users.
3. Build interactivity in multimedia application based on the current authoring tools used by the industry.

Synopsis

This subject will introduce the various stages of interactive media project development from definition to the delivery of a multimedia product. The students will be introduced to instructional design followed by different stages in the product development including learning objects including prior analysis, the design, delivery considerations and evaluation. The lessons will also cover different models in instructional design, e-learning standards and concept of interactivity. Lab sessions will cover tools that assist the development on an interactive learning product including iBook Author and Unity. A complete project and report has to be submitted at the end of the semester.

References

1. Farah Nadia Azman, Interactive Media Authoring Lab Module, Penerbit UTeM, 2011.

2. Blaire, Preston, Cartoon Animation (The Collector's Series), Walter Foster, 2009.

3. Nellie McKesson and Adam Witwer, Publishing with iBooks Author, O'Reilly Media, Inc, 2012

4. Michael Garofalo, The Unofficial GameSalad® Textbook, Photics, 2012.

5. Ryan Henson Creighton, Unity 3D Game Development by Example, Beginner's Guide, Packt Publishing, 2010.

6. Ryan Henson Creighton, Unity 4. X Game Development by Example, Packt Publishing, 2013.

BITM 2123 Digital Audio and Video Technology (3, 2, 2)

Learning Outcomes

Upon completion of this course, students should be able to:

1. Explain and apply the knowledge and principles of digital audio and video in computer games environment.
2. Demonstrate advanced skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Choose and organize audio video software and hardware in the conducive production environment with the latest and relevance information.

Synopsis

This course will give details and valuable insights of digital audio and video production. Throughout the semester, students will be introduced to relevant topics on digital audio and video hardware, the art of audio production, recording techniques, video production, the integration of other media in video product,

implementing special effects, and storyboarding. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References

1. Mohd Hafiz Zakaria, Zulisman Maksom, Wan Sazli Nasaruddin Saifudin, and Mohd Haziq Lim Abdullah, in Press 2015. Digital Audio and Video Technology: Classroom in a book, Penerbit Universiti UTeM.
2. Mohd Haziq Lim Abdullah, Mohd Hafiz Zakaria, and Wan Sazli Nasaruddin Saifudin, 2010. Digital Audio and Video Technology: Lab Module, Penerbit Universiti UTeM.
3. Ken C. Pohlmann, 2010. Principles of Digital Audio, Sixth Edition, McGraw-Hill Professional
4. Ananda Mitra, 2010. Digital Video: Moving Images and Computers, Facts on File Publishing
5. Adobe Creative Team, 2012. Adobe Premiere Pro CS6 Classroom in a Book, Adobe Press

BITS 3533 Wireless Network & Mobile Computing (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate standards of cellular telecommunication and wireless networks.
2. Identify different types of wireless network, its protocols, and applications.
3. Construct online applications utilizing wireless networks technologies.

Synopsis

This course is designed to give the knowledge of the concept of mobile computing and wireless networks, by exploring the relationship between hardware, software and development kits. Through class, research and application development, students will understand the current mobile technology and the relation to operating systems and standards. Students will be exposed to the challenges to handle the constraints of memory and storage of these hardware.

References

1. Molisch, Andreas F., Wireless Communications, ISBN : 978047041870, John Wiley & Sons, 2011
2. Arshdeep Bahga, Vijay Madisetti, Internet of Things (A Hands-on-Approach), ISBN: 0996025510, VPT Aug 2014.
3. Paul Bedell, Cellular Networks: Design and Operation – A Real World Perspective, ISBN: 1478732083, Outskirts Press Aug 2014.
4. Mr Mark A Lassoff, Mr Tom Stachowitz, Mobile App Development with HTML5, ISBN: 0692405054, LearnToProgram, Incorporated Mar 2015.
5. Erik Dahlman, Stefan Parlvall, Johan Skold, 4G: LTE/LTE-Advanced for Mobile Broadband, ISBN: 012385489X, Academic Press, 2011.
6. Thomas J. Duffy, Programming with Mobile Applications: Android(TM), iOS, and Mobile Phone 7, ISBN: 1133628133, Course Technology, 2012

BITS 3443 Digital Forensics (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Describe the concept of digital forensic and investigation.
2. Distinguish multi-operating system nuance with respect to digital forensics.

3. Manipulate the process of forensic investigation using particular tools by referring the digital forensic investigation methodology.

Synopsis

This course is an introduction to digital forensics reflects the need for conducting professional computing investigations. Students will explore general computer investigations, security issues with operating systems, setup and maintenance of a digital forensics lab, use of computer forensics tools, digital evidence controls, data acquisition and analysis, e-mail investigations, and the preparation of investigation report.

References

1. John Sammons, 2012, *the Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics*, Syngress, ISBN 978-1597496612

2. Cory Altheide, Harlan Carvey, 2011, *Digital Forensics with Open Source Tools*, Syngress, ISBN 978-1597495868

3. Casey E, 2011. *Digital Evidence and Computer Crime*, 3rd Edition, Academic Press, ISBN–13: 978-0123742681

4. Nelson B., Phillips A., Enfinger F. and Steuart C., 2015. *Guide to Computer Forensics and Investigations*, 5th Edition, Thomson Course Technology, ISBN 978-1285060033

5. Marjie T. Britz, 2013. *The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics*, 3rd Edition, Prentice Hall, ISBN–13: 978-0132677714.

BITS 2513 Internet Technology (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Discover the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Select the system requirements aligned with the current technology advancement.
3. Display the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web-based knowledge also contribute to this phenomenon. This course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study include: basic concepts and client, networking, programming on the Internet, security and Internet applications.

References

1. James F.Kurose and Keith W. Ross, (2012). Computer Networking: A Top-Down Approach. 6th Edition, Pearson.

2. Brian Williams, Stacey Swayer (2010). Using Information Technology 9e Complete Edition.Career Education.

3. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing.

4. Douglas E. Comer (2007). The Internet 4th edition. Pearson Prentice Hall.

5. Preston Gralla (2006). How Internet Works 8th edition. Que Publishing

6. Fred T. Hofstetter (2005), Internet Technologies at Work, McGraw Hill Technology Education

7. Wahidah, Robiah, Siti Rahayu, Nurul Azma and Norharyati (2015). Internet Technology: Lab Companion. Penerbit Universiti, UTeM.

BITM 2113 Web Application Development (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Discuss the concept and the principle of Internet and WWW based on the latest technologies.
2. Use the important component in web application development which are Client Site Technology, Server Site Technology, Database Server and Web Server.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are

- Client Site Technologies: HTML, CSS, XML, and JavaScript
- Server Site Technologies: PHP
- Database Server: MySQL.
- Web Servers : Apache

References

1. Robert W.Sebesta (2015), Programming The World Wide Web – 8th Edition, Pearson, ISBN:0133775984

2. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5) 4th Edition. O'Reilly Media. ISBN-13: 978-1491918661.

3. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.

4. Keith Darlington (2005), Effective Website Development – Tools and Techniques, Addison Wesley, ISBN: 0-321-18472-6

5. Luke Welling, Laura Thomson (2008), PHP and MySQL Web Development – 4th Edition, Addison-Wesley, ISBN: 0672329166

BACHELOR OF COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE) WITH HONOURS

COURSE LEARNING OUTCOMES

Bachelor of Computer Science (Artificial Intelligence) academic programme is offered to prepare graduates with a thorough understanding and superior skills of Computer Science, particularly in the area of Artificial Intelligence. Graduates will also be equipped with advanced scientific knowledge and engineering skills in Artificial Intelligence to fulfil industrial needs especially in the field of ICT, robotics and manufacturing.

LEARNING OUTCOMES

The aim of the Bachelor of Computer Science (Artificial Intelligence) programme is to produce students with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to apply AI techniques such as searching techniques, fuzzy logic, machine learning, neural networks, evolutionary computing, and intelligent agents in developing a system.
iv. Equipped with skills to develop individually or in a group on artificial intelligence based systems such as intelligent systems, expert systems, intelligent agent systems and robotic systems.
v. Able to conduct research in the fields related and based on AI.
vi. Able to resolve problems in a creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

There is a wide range of career opportunities in the field of computer science and information technology available for graduates who are specialized in AI. Among the career opportunities are listed below:

i. Knowledge Engineer
ii. Intelligent Systems or Expert Systems Developer
iii. System Analyst/Programmer/Designer
iv. Software Developer/Consultant
v. Computer/Data Scientist
vi. Researcher

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Artificial Intelligence) degree. The programme consists of the following components:

Components	Credit Hours
University Compulsory Subjects	18
Program Core Subjects	66
Course Core Subjects	24
Elective subjects	12
TOTAL	120

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations– TITAS
BLHW 2 712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English for Professional Communication
BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (66 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITP 1113	Programming Technique
BITP 1123	Data Structure and Algorithm
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITP 3113	Object Oriented Programming
BITP 2213	Software Engineering
BITS 1123	Computer Organization and Architecture
BITS 1213	Operating System
BITS 1313	Data Communication and Networking
BITM 1113	Multimedia System
BITI 1113	Artificial Intelligence
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II

COURSE CORE SUBJECTS (24 credits)

BITI 2113	Logic Programming
BITI 2223	Machine Learning
BITI 2213	Knowledge Based System
BITI 3533	Artificial Intelligence Project Management
BITI 3123	Fuzzy Logic
BITI 3133	Neural Network
BITI 3143	Evolutionary Computing
BITS 3423	Information Technology Security

ELECTIVE SUBJECTS (12 credits)

Choose any 4 (FOUR) from the following.

BITI 3113	Intelligent Agent
BITI 3523	Artificial Intelligence in Robotics and Automation
BITI 3313	Image Processing & Pattern Recognition
BITM 3133	Computer Games Development
BITS 2513	Internet Technology
BITM 2113	Web Application Development
BITP 3443	Formal Methods
BITP 3253	Software Verification and Validation

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 1702	Islamic and Asian Civilizations	2	0	2	
BLHW 2712	Ethnic Relations	2	0	2	
BITI 1213	Linear Algebra and Discrete Mathematics	2	2	3	
BITS 1123	Computer Organization and Architecture	2	2	3	
BITP 1113	Programming Technique	2	2	3	
BITM 1113	Multimedia Systems	2	2	3	
	TOTAL			16	

Note:
1. BLHW 1702 Islamic and Asian Civilizations (local) is replaced with BLHW 1942 Malaysia Studies for International students.
2. BLHW 2712 Ethnic Relations is replace with BLHW 2752 Malaysian Culture (for international students).
3. BLHL 1012 Bahasa Melayu Komunikasi for International students.

Year One (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 2403	Technical English	3	0	3	
BITI 1223	Calculus and Numerical Methods	2	2	3	
BITP 1123	Data Structure and Algorithms	2	2	3	BITP 1113
BITP 1323	Database	2	2	3	
BITS 1213	Operating Systems	2	2	3	
BITI 1113	Artificial Intelligence	2	2	3	
	TOTAL			18	

Year Two (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English for Professional Communication	3	0	3	
BITI 2233	Statistics and Probability	2	2	3	
BITU 2913	Workshop I	0	9	3	BITP 1113
BITI 2113	Logic Programming	2	2	3	BITI 1113
BITP 3113	Object Oriented Programming	2	2	3	BITP 1123
BITS 1313	Data Communication and Networking	2	2	3	
	TOTAL			18	

Year Two (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-curriculum I*	0	3	1	
BLHC 4032	Critical and Creative Thinking	2	0	2	
BITI 2213	Knowledge Based Systems	2	2	3	BITI 1113
BITP 2213	Software Engineering	2	2	3	
BITI 2223	Machine Learning	2	2	3	BITI 1113
BITM 2313	Human Computer Interaction	2	2	3	
BIT- ----	Elective I	2	2	3	
	TOTAL			18	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registerer*

Year Three (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-curriculum II*	0	3	1	
BLHL ----	Third Language**	1	2	2	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITI 3123	Fuzzy Logic	2	2	3	BITI 1113
BITI 3133	Neural Networks	2	2	3	BITI 1113
BITI 3533	Artificial Intelligence Project Management	2	2	3	
BIT- ----	Elective II	2	2	3	
	TOTAL			18	

** This subject can be taken in any semester. Please refer to co-curriculum unit before registered.*

Year Three (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BPTW 4012	Technology Entrepreneurship	2	0	2	
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BITI 3143	Evolutionary Computing	2	2	3	BITI 1113
BITS 3423	Information Technology Security	2	2	3	
BIT- ----	Elective III	2	2	3	
BIT- ----	Elective IV	2	2	3	
	TOTAL			17	

Year Three (Special Semester)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
	TOTAL			3	

*Equivalent to 25 hours of Self-Learning Time

Year Four (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	
BITU 3946	Industrial Training Report	0	24	6	
	TOTAL			12	

Note: Pre-requisite (completed all subjects)

Elective Subjects

Below is a list of elective subjects that can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subjects given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITI 3113	Intelligent Agents	2	2	3	BITP 3113
BITI 3523	Artificial Intelligence in Robotics and Automation	2	2	3	BITI 1223
BITI 3313	Image Processing and Pattern Recognition	2	2	3	BITI 1113
BITM 3133	Computer Games Development	2	2	3	
BITS 2513	Internet Technology	2	2	3	
BITM 2113	Web Application Development	2	2	3	
BITP 3453	Formal Methods	2	2	3	
BITP 3253	Software Verfication and Validation	2	2	3	BITP 2213
	TOTAL			12	

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
BLHL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completion this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Discrete Mathematics. Topics for Linear Algebra include linear equations, matrices, determinants,vectors in R^n, real vector spaces, eigenvalues, linear transformation, and introduction to linear programming. Topics for discrete mathematics consist of logics, sets, function, algorithms, integers, mathematical reasoning, counting, relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus and Numerical Methods (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems.

Synopsis

This course covers two areas of mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part topics consist of Errors, TaylorPolynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution forInitial Value Problems.

References

1. Atkinson, K. and Han, W., 2004. *Elementary Numerical Analysis, 3rd* Ed., New York: John Wiley & Sons.
2. Atkinson, K., Han, W. Stewart, D.E., 2009. *Numerical Solution of Ordinary Differential Equations*., New Jersey: John Wiley & Sons.

3. Faires, J.D. and Burden, R.L., 2011. *Numerical Analysis*, 9th Ed., Boston: Brooks/Cole.

4. Fowler, J. and Snapp, B., 2014. *MOOculus Calculus* [online] Available at: https://mooculus.osu.edu [Accessed on 28 January 2015].
5. Heinbockel, J.H., 2012. *Introduction to Calculus* [online] Available at www.math.odu.edu/~jhh/Volume-1.PDF [Accessed on 28 January 2015].

6. Varberg,D., Purcell, E. J., and Rigdon,S.E., 2007. *Calculus,* 9th Ed., New Jersey: Pearson Education.

BITI 2233 Statistics and Probability [3, 2, 2]

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate understanding of the concept and fundamentals of statistics and probability.
2. Reproduce solutions for application problems using statistical software.
3. Solve application problems using appropriate statistical techniques.

Synopsis

This course will provide a comprehensive introduction to statistics and probability for computer science students. Topics that will be covered in this course includes data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distribution. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing, estimation and hypothesis testing for two populations, simple linear regression and correlation, and one-way ANOVA. In this course, students are guided to use statistical software to perform descriptive and inferential statistics analysis

References

1. Navidi, W., (2014), "Statistics for Engineers and Scientists", 4th Edition,McGraw-Hill Education.

2. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), "Probability and Statistics for Engineers & Scientist", 9th Edition, Pearson Educational International.

3. Devore, J. L., (2011) "Probability and Statistics for Engineering and the Sciences", 8th Edition, Thomson.

4. Montgomery, D. C., Runger, G. C.,(2011), "Applied Statistics and Probability for Engineers", 3rd Edition, John Wiley.

5. Johnson, R., Freund, J., Miller, I., (2011), "Probability and Statistics for Engineers, 8th Edition", Pearson Educational International.

6. Mann, P. S., (2013), "Introductory Statistics", 8th Edition, Wiley.

7. Sh. Sara, Hanissah, Fauziah, Nortazi, Farah Shahnaz (2008), "Introduction to Statistics & Probability A Study Guide", Pearson Educational International.

BITP 1113 Programming Technique (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications.
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and

operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.

2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.

3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.

4. Liang, Y. D.(2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.

5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

BITP 1123 Data Structure and Algorithm (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation.
2. Apply the suitable data structures for an application that requires data structures.
3. Construct the data structures and algorithms in problem solving.

Synopsis

This course introduces the students to data structures and algorithms. The basic concepts in structure, class, array and pointer are discussed in order to understand the fundamental of data structures and algorithms. The course focuses on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics cover the algorithms. This also includes the algorithm efficiency for run time. Pseudo code and C++ programming language will be used in algorithm implementation. Apart from the theory, the students are asked to apply the data structures and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "C++ Programming: Program Design Including Data Structures". 7th, edition, Cengage Learning, 2014.

2. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++",4thEdition, Addison Wesley, 2011.

3. Michael T. Goodrich, Roberto Tamassia& David M. Mount,"Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.

4. Goodrich, M. T.,Tamassia, R. and Mount, D. M. (2011).Data structures and algorithms in C++.2nd edition, Hoboken, NJ, Wiley.

5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITM 2313 Human Computer Interaction (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.

2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Julie A. Jacko Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, Third Edition (Human Factors and Ergonomics), CRC Press 2012.

2. Ben Shneiderman et al, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition), 2009.

3. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (2nd Edition), John Wiley & Sons, 2007.

4. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.

BITP 1323 Database (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA).
2. Construct a relational database according to user requirements.
3. Solve simple and complex queries using Structured Query Language.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.

4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 3113 Object Oriented Programming (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the Relationsship among classes.

2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.

3. Perform implementation of classes and Methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs.

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures, GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop complete Java applications with database.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.

2. Deitel, H. M. & Deitel, P. J., Java How To Program, 10th Ed., Pearson Education International, 2014.

3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.

4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.

5. Cadenhead, Rogers, Java in 24 Hours, Sams Teach Yourself (Covering Java 8) (7th Edition), SAMS, 2014.

6. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015.

BITP 2213 Software Engineering (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Apply the concept of software engineering for system development.
2. Explain the principles and practices of software engineering in the system development.
3. Follow the standard guideline to produce formal specifications and software modeling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Sommerville, I., Mac 2015, Software Engineering, 10th Edition, Addison-Wesley.

2. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.

3. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.

4. Chemuturi, M. And Caghley, T. M. J., 2010, Mastering Software Project Management: Best Practices, Tools and Techniques, J. Ross Publishing.

5. Bruegge, B. and Dutoit, A. H., 2010, Object-oriented Software Enginering: Using UML, patterns and Java, Prentice Hall

6. Pressman, Roger S., 2010, Software Engineering: A Practitioner's Approach, Seventh (7th) Edition, McGraw-Hill.

7. Ahmad, S. et al, (2013), A Student's Guide: UML for Software Engineering, Penerbit UTeM.

BITS 1123 Computer Organization and Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input / Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013. Computer Organization and Design: The Hardware/Software Interface, 5th Edition. Morgan Kauffman.

2. Linda Null and Julia Lobur(2014). The Essentials of Computer Organization and Architecture, 4th Edition. Jones & Bartletts Pub.

3. Aslinda, Fahmi, Nurul Azma, Zakiah and Zurina. Lecture Slides: Computer Organization & Arcitecture. Second Edition

4. Syarulnaziah, Zakiah, Marliza., Aslinda. Lab Module: Computer Organization and Architecture With MIPS Programming.

5. William Stallings, (2013). Computer Organization and Architecture, 9th Edition. Pearson.

6. Andrew S. Tanenbaum, (2013). Structured Computer Organization 6th Edition. Prentice Hall.

7. Irv. Englander (2014).The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.John Wiley & Sons.

BITS 1213 Operating System (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts, theory and technology used in operating system.
2. Demonstrate the major components and functionalities of an operating system.
3. Display the basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.

2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed. Addison-Wesley.

3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.

4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.

5. Md Shah, W., Anawar, S., and Zakaria, NA., (2016). Ubuntu: Guide for Basic Administration, Module 23, Penerbit Universiti, UTeM.

6. www.ubuntu.com

BITS 1313 Data Communication and Networking (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Build the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Manipulate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understands the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and apply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring basic computer networks using guided or unguided media.

References

1. Forouzan, Behrouz A., 2012. *Data Communications and Networking*, 5th Edition, McGraw-Hill.

2. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. *Lab Companion: Data Communications and Networking*, 1st Edition.

3. William Stallings, 2013. *Data and Computer Communications*, 10th Edition, Pearson.

4. Massoud Moussavi, 2011. *Data Communication and Networking: A Practical Approach*, 1st Edition, Cengage Learning.

5. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, *Business Data Communications and Networking*, 12th Edition, Pearson

6. Bahaman, Nazrulazhar, Hamid, Erman and Mat Ariff, Azman, 2013. *Data Communications and Networking: Practical Approach*, 3rd Edition, Venton.

7. Curt M. White, 2012. Data Communications and Computer Networks, Cengage Learning

8. Randall J. Boyle, Jeffrey A. Clements, 2013. *Applied Networking Labs,* 2nd Edition, Prentice Hall

BITM 1113 Multimedia System (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Interpret the core concept of multimedia elements.
2. Construct multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs.
3. Demonstrate problem solving skills for multimedia project development.

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D/3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communcation skills while performing their various tasks and project. Cooperative Learning (CL), Problem Based Learning (PBL), Cooperative Learning and Collaborative Learning approach will be used to enhance student's capability such as competency, attitude, knowledge and communication skills.

References

1. Norasiken, B., Huoy, C. Y., Mohamad Lutfi, D., Farah, N. A. & Ahmad, N. C. P., (2014), Multimedia System, University Technical Malaysia Melaka, Module.

2. Vaughan, T., (2014), Multimedia: Making It Work 8th Edition (Ninth Edition), McGraw-Hill Osborne Media.

3. Philips, R., (2013), The Developer's Handbook to Interactive Multimedia, Routledge – Taylors & Francis Group.

4. Burg, J., (2009), The Science of Digital Media, Prentice Hall.
5. Li, Z., Drew, M. S., and Liu, J., (2014) Fundamental of Multimedia (Second Edition), Springer.

BITI 1113 Artificial Intelligence (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the definition of Artificial Intelligence and its techniques.
2. Classify the types of Artificial Intelligence techniques.
3. Follow the Artificial Intelligence techniques in problem solving.

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References

1. Russel, S & Norvig, P. (2010). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
2. Luger, G. F. (2015). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Pearson Education.
3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
4. Kopec, D, Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

BITU 2913 Workshop I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually.
2. Identify and solve problems in systematic way.
3. Defend while presenting result of the project.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. Workshop 1 is also functioned as the platform to prepare the students for their industrial training program.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.
2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son.
3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.
4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.
5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives.
2. Practise the knowledge and skills that they have learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.
4. Report technical tasks performed into a technical journal.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Report on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3, 0, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review.
2. Develop project using an appropriate method.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3, 0, 9)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has potential commercial value.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

COURSE CORE SUBJECTS

BITI 2113 Logic Programming (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Identify elements and concepts of logic and procedural programming.
2. Reproduce the Prolog algorithm for solving logic programming problems.
3. Demonstrate basic programs using logic programming structures.

Synopsis

Students are exposed to the basic of logic programming which include the syntax and semantics of Prolog software. Elements such as predicate logic, rules, and queries, recursive rule, controlling backtracking, unification and input output are the main concern while conducting this course. This course use Prolog software to develop the simple computer solution of some AI applications such as problem solving, and expert systems.

References

1. Ivan Bratko (2012), *Prolog Programming For Artificial Intelligence*, Addison Wesley
2. Max Bramer, Johan Bos and Kristina Striegnitz, (2013), *Logic Programming with Prolog*, Springer.
3. Randall Scott, (2010), *A Guide to Artificial Intelligence with Visual Prolog*, Outskirts Press.
4. Richard O'Keefee (2009). *The Craft of Prolog*. The MIT Press.
5. Saroj Kaushik (2007), *Logic And Prolog Programming*, New Age International.

BITI 2223 Machine Learning (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate the fundamental concept of machine learning theory.
2. Select the appropriate techniques in machine learning problem solving.
3. Demonstrate machine learning algorithm based on machine learning concepts.

Synopsis

Students are exposed to the foundation of machine learning, which is the study of how to build a computer system that learns from experience. The course starts with an overview of Data Mining for a background study. Main topics that will be covered are such as concept learning, decision tree learning, Bayesian learning, instance-based learning, learning sets of rules, and reinforcement learning. Besides, some applications of machine learning including robotic control, autonomous navigation, bioinformatics, speech recognition, and web data processing will be introduced.

References

1. Flach, P., (2012), Machine Learning: The Art and Science of Algorithms that Make Sense of Data, Cambridge University Press.
2. Stephen Marsland (2009), Machine Learning: An Algorithmic Perspective, Chapman & Hall/Crc Machine Learning & Pattern Recognition
3. Witten, I.A., Frank, E., (2011), Data Mining: Practical Machine Learning and Techniques (Third Edition), Morgan Kaufmann.
4. Roges, S. and Girolami, M., (2011), A First Course in Machine Learning, 1st edition, Chapman and Hall/CRC.
5. Barber, D., (2012), Bayesian Reasoning and Machine Learning, Cambridge University Press

BITI 2213 Knowledge Based System (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Define the fundamental concept of knowledge based systems, components and lifecycle.
2. Compare different knowledge representations and reasoning in knowledge-based system.
3. Apply a basic knowledge based system based on appropriate concept and components.

Synopsis

The purpose of this course is to introduce the students to the concept of knowledge-based systems (KBS) such as phases of developing KBS, types of knowledge representations, knowledge acquisitions, and types of inference techniques and reasoning. Students also are exposed to Expert Systems as one of the KBS.

References

1. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.

2. Joseph Giarratano and Gary Riley (2005), *Expert Systems-Principles and Programming (4th Edition),* Thomson/PWS Publishing Company.

3. Michael M. Ritcher and Rosina Weber (2013), *Case-Based Reasoning: A Textbook*, 2013th Edition, Springer.

4. M Sasikumar, S Ramani, S Muthu Raman, KSR Anjaneyulu, and R Chandrasekar (2007), *A Practical Introduction to Rule Based Expert Systems*, Narosa Publishing House, New Delhi.

5. Petricğ Vizureanu (Eds) (2010), *Expert Systems*, Published by Intech.

BITI 3533 Artificial Intelligence Project Management (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the students should be able to :

1. Relate activities and scopes that involved in managing artificial intelligence project.
2. Analyse project requirements and choose appropriate approaches in managing artificial intelligence project.
3. Organise artificial intelligence development project effectively.

Synopsis

This course provides students with fundamental discipline in managing artificial intelligence project. The course exposes students to a variety of techniques to manage people, budget, schedule, risk and quality of artificial intelligence project. The course also provides skills to the students on how to analyze potential problems in managing project that they would responsible for.

References

1. Jefferson Hanley (2015), Project Management: A Compact Guide to the Complex World of Project Management, CreateSpace Independent Publishing Platform.

2. Ed Stark (2014), Project Management For Beginners: Proven Project Management Methods To Complete Projects with Time And Money To Spare, CreateSpace Independent Publishing Platform

3. Peter Rausch, Alaa F. Sheta, Aladdin Ayesh (2013), Business Intelligence and Performance Management: Theory, Systems and Industrial Applications, Springer.

4. Project Management Institute (2013), A Guide to the Project Management Body of Knowledge: PMBOK(R) Guide 5th Edition. Project Management Institute.

5. Nicolai Andler (2012), Tools for Project Management, Workshops and Consulting: A Must-Have

Compendium of Essential Tools and Techniques, John Wiley & Sons

BITI 3123 Fuzzy Logic (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Relate various concepts of fuzzy logic to problem solving.
2. Organize solution steps in solving fuzzy logic problem.
3. Demonstrate computer program based on fundamental methods of fuzzylogic for problem solving.

Synopsis

The course aims to provide exposure on the foundation of fuzzy logic as one of the soft computing techniques. The course starts with an overview on the concept of fuzziness. The main topics will cover the algebra, quantities and the logical aspect of fuzzy sets, fuzzy membership functions, fuzzy operations, fuzzification, de-fuzzification, and fuzzy system. Various applications of fuzzy system such as the automated fuzzy system, fuzzy decision making system, fuzzy classification and clustering system, fuzzy pattern recognition system and fuzzy control system will be included in the discussion.

References

1. Ross, T. J. (2010). Fuzzy Logic with Engineering Applications, 3rd Edition, John Wiley.

2. The Mathworks Inc. (2013). Fuzzy Logic Toolbox, http://www.mathworks.com/products/fuzzy-logic/index.html, dated:16/8/2013

3. Selected papers by Prof. L. A. Zadeh downloaded from the website at TheBerkeley Initiative in Soft Computing (BISC) (2013). http://www.cs.berkeley.edu/~zadeh/papers/index.htm, dated: 16/8/2013

4. Sivanandam, S. N., Sumathi, S. and Deepa, S. N. (2010). Introduction to Fuzzy Logic Using Matlab. Springer.
5. James, J.B. (2002). An introduction to fuzzy logic and fuzzy sets. CRC Press.

BITI 3133 Neural Network [3, 2, 2]

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Identify various techniques in neural network.
2. Construct solution steps in solving neural network problem.
3. Write computer programme based on fundamental method of neural network for problem solving.

Synopsis

This course will discuss one of soft computing techniques, which is neural network. The fundamental theories of neural network is introduced, which includes biological and statistical foundations of neural networks. Radial Basis, Hebbian and competitive learning also will be introduced. Additionally, types of learning, information theories and their applications in neural networks will be discussed.

References

1. Kumar, S. (2013). Neural networks: a classroom approach. Mc Graw Hill, New Delhi.
2. Hagan, T.M., Howard, B.D., Mark, H.B., Orlando, D. (2014). Neural Network Design. Martin Hagan, Texas.
3. Haikin, S. (2013). Neural Networks and Learning Machines. Pearson Education, Inc. New Jersey.
4. Huajin Tang, K. C. Tan, Yi Zhang (2007). Neural Networks: Computational Models and Applications, Springer.
5. Jeff, H. (2015). Artificial Intelligence For Humans: Deep Learning And Neural Networks. Heaton Research Inc. Chesterfield.

BITI 3143 Evolutionary Computing (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Demonstrate the understanding of the fundamental concept of evolutionary computing.
2. Identify different approaches in evolutionary computing.
3. Use the evolutionary computing techniques in problem solving.

Synopsis

The purpose of this course is to introduce evolutionary computing in problem-solving. Evolutionary computing uses algorithms which are inspired by mechanisms of biological evolution. These search-algorithms apply the concepts of genetic recombination, mutation, and natural selection in producing the potential solutions. A number of evolutionary computing techniques will be taught, and this course puts greater emphasis on Genetic Algorithms. Other techniques such as Memetic Algorithm and constraints handling will also be covered in this course.

References

1. Yu, X., Gen, M., (2010) Introduction to Evolutionary Algorithms, Springer
2. Spears, W.M., (2010) Evolutionary Algorithms: The Role of Mutation and Recombination, Springer
3. Eiben, A.E., Smith, J.E., (2008) Introduction to Evolutionary Computing, Springer
4. Simon, D., (2013) Evolutionary Optimization Algorithms, Wiley
5. Yu, T., Baydar, C., Roy, R. (2010) Evolutionary Computation in Practice, Springer

BITS 3423 Information Technology Security (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. Explain the concept and issues of information technology security
2. Distinguish the suitable components in providing security services and mechanism in computer software, operating system, database and network system
3. Manipulate an appropriate security system mechanism ethically

Synopsis

Security in Information Technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this subject, student will be able to learn security services that covered Confidentiality, Integrity and Availability (CIA) in ICT based system. This subject also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

1. Michael Goodrich, and Roberto Tamassia (2010), Introduction to Computer Security , Addison Wesley, ISBN 9780321512949.

2. W. Stallings (2010). Network Security Essentials: Applications and Standards, 4th edition, Prentice Hall, Inc, ISBN 978-0136108054.

3. D. Gollmann (2011). 3rd Edition, Computer Security, John Wiley & Sons, Inc, ISBN 978-0470741153

4. R. Bragg (2012). Certified Information systems Security Professional Training Guide, Que Certification, ISBN 0-7897-2801-x.

ELECTIVE SUBJECTS

BITI 3113 Intelligent Agent (3, 2, 2)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Differentiate various concepts of intelligent agent.
2. Organise solution steps in solving intelligent agent problem.
3. Manipulate computer programme based on fundamental techniques of intelligent agents for problem solving.

Synopsis

This course will cover the underlying theory of agents, the common agent architectures, methods of cooperation and communication, and the potential applications for agents. Students will be exposed to the concept of intelligent agent and multiagent systems. Students will also construct their own agents for solving different types of problems. The potential applications of agents are numerous including web search assistants, travel advisors, electronic secretaries, bidders in on-line auctions, tutoring systems, and actors in games or simulations. Some of the tools to be used are Jade and Jason.

Reference

1. Gerhard Weiss (2013), Multiagent Systems, 2nd Edition, MIT Press

2. Rafael H. Bordini, Mehdi Dastani and Amal El Fallah Seghrouchni (2013), Multi-Agent Programming: Languages, Platforms and Applications (Multiagent Systems, Artificial Societies, and Simulated Organizations)

3. Tomas Salamon (2011). Design of Agent-Based Models : Developing Computer Simulations for a Better Understanding of Social Processes. Bruckner Publishing.

4. Micheal Negnevitsky (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.

5. Faisal Alkhateeb, Eslam Al Maghayreh and Iyad Abu Doush (2011), Multi-Agent Systems - Modeling, Control, Programming, Simulations and Applications. Intech.

BITI 3313 Image Processing & Pattern Recognition (3, 2, 2)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Differentiate various concepts of image processing and pattern recognition
2. Identify solution steps in solving image processing and pattern recognition problems
3. Construct computer program based on image

Synopsis

Images contain enormous amounts of information that can be extracted by means of image processing and pattern recognition techniques. This course provides students with essential knowledge to understand the principles of image processing and

pattern recognition and skill to construct computer program for analysis and interpretation of images. Fundamental image processing and pattern recognition techniques introduced in this course include image enhancement, image restoration, colour image processing, image morphology, image segmentation, feature extraction and object recognition. Students will also be exposed to image processing and pattern recognition applications in fields such as medical imaging, manufacturing, remote sensing and robotics.

References

1. Gonzalez, R. C. & Woods, R. E. (2008) *Digital Image Processing*, 3nd Edition, Prentice Hall.

2. Gonzalez, R. C. & Woods, R. E. & Eddins, S. L. (2009) *Digital Image Processing Using MATLAB*, Prentice Hall.

3. Solomon, C. & Breckon, T. (2011) *Fundamentals of Digital Image Processing: A Practical Approach with Examples in Matlab*, Wiley-Blackwell.

BITI 3523 Artificial Intelligence in Robotics & Automation (3, 2, 2)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Analyze fundamental concepts related to robotics.
2. Organize solution steps in solving robotics using Artificial Intelligence concepts
3. Construct robotics & automation programming for practical uses.

Synopsis

This course covers introduction of robotics, which includes principles behind the Artificial Intelligence approach to robotics & to program an artificially intelligent robot for applications involving sensing, navigation & uncertainty. The students also will be exposed to the principles of automation and mobile robotics programming as well as health & safety issues. Ethical aspects and the future of AI in robotics & automation are also covered.

References

1. Robin R. Murphy (2000) “Introduction to AI Robotics”. The MIT Press.

2. Sebastian Thrun, Wolfram Burgard & Dieter Fox (2005) “Probabilistic Robotics”. The MIT Press.

3. Gordon McComb,(2011), Robot Builder's Bonanza, McGraw-Hill

4. Widodo Budiharto & Paulus Andi Nalwan (2013), Membuat Sendiri Robot Humanoid, Synergy Media.

5. Widodo Budiharto (2013), Membuat Sendiri Robot, Synergy Media.

BITM 3133 Computer Games Development (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the principles, basic interface design and the technologies behind the rules to play a game.
2. Show how the functions of a computer games can be used to create experience including rules design, game mechanic, game balancing and social game integration into game experience.
3. Apply problem solving skills in planning and developing a computer game project.

Synopsis

This course is conducted to give an exposure to students with regards to core concepts of computer games design and games technology. The topics which the students will learn include the game comcepts, character development, creating the user experience, game balancing as well as the game genre such as

action games, adventure games, puzzle games and construction management games.

References

1. Adams, E. (2010). Fundamentals of Game Design (2nd Edition). New Riders.
2. Rodgers, S. (2010). Level Up!: The Guide to Great Video Game Design. Wiley.
3. Thorn, A. (2010). Game Engine Design and Implementation. Jones & Barlett Publisher.
4. Fulton, J. and Fulton, S. (2010). Flash Games : Building Interactive Entertainment with ActionScript 3.0.
5. Feronato, E. (2011). Flash : Game Development by Example. Packt Publishing

BITS 2513 Internet Technology (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Discover the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Select the system requirements aligned with the current technology advancement.
3. Display the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web-based knowledge also contribute to this phenomenon. This course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study include: basic concepts and client, networking, programming on the Internet, security and Internet applications.

References

1. James F.Kurose And Keith W. Ross, (2012). Computer Networking: A Top-Down Approach. 6th Edition, Pearson.
2. Brian Williams, Stacey Swayer (2010). Using Information Technology 9E Complete Edition.Career Education.
3. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing.
4. Douglas E. Comer (2007). The Internet 4th edition. Pearson Prentice Hall.
5. Preston Gralla (2006). How Internet Works 8th edition. Que Publishing
6. Fred T. Hofstetter (2005), Internet Technologies at Work, McGraw Hill Technology Education
7. Wahidah, Robiah, Siti Rahayu, Nurul Azma and Norharyati (2015). Internet Technology: Lab Companion. Penerbit Universiti, UTeM.

BITM 2113 Web Application Development (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Discuss the concept and the principle of Internet and WWW based on the latest technologies.
2. Use the important component in web application development which are Client Site Technology, Server Site Technology, Database Server and Web Server.

3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are

- Client Site Technologies: HTML, CSS, XML, and JavaScript
- Server Site Technologies: PHP
- Database Server: MySQL.
- Web Servers : Apache

References

1. Robert W.Sebesta (2015), Programming The World Wide Web – 8th Edition, Pearson, ISBN:0133775984

2. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5) 4th Edition. O'Reilly Media. ISBN-13: 978-1491918661.

3. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.

4. Keith Darlington (2005), Effective Website Development – Tools and Techniques, Addison Wesley, ISBN: 0-321-18472-6

5. Luke Welling, Laura Thomson (2008), PHP and MySQL Web Development – 4th Edition, Addison-Wesley, ISBN: 0672329166

BITP 3443 Formal Methods (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Demonstrate the understanding of the usage of formal methods and its function in general.
2. Apply formal methods for specification, analysis and design.
3. Assess analysis techniques for appropriate usage.

Synopsis

This course covers the fundamentals of Formal Methods and can be used as a basic course for software engineering. We will examine techniques for modeling and formally analyzing computing systems and will consider applications in software and hardware. Students will learn the fundamentals of classical logic, induction and recursion, program semantics, rewriting, reactive systems, temporal logic, model checking, and abstraction. We will examine how these Methods can be used to build reliable software and hardware.

References

1. Formal Methods: Industrial Used from Model to the Code. Boulanger, Jean-Louis (Ed.),Wiley, 2012. (ISBN: 978-1-84821-362-3)

2. Formal Methods and Models for System Design. A system level perspective. Gupta, R.; Le Guernic, P.; Shukla, S.K.; Talpin, J.-P. (Eds.),Springer-Verlag, 2004.

3. Mathematical Logic, Second Edition. H.-D. Ebbinghaus and J. Flum and W. Thomas. Springer-Verlag, 1994.

4. Computer-Aided Reasoning: An Approach. Matt Kaufmann, Panagiotis Manolios, and J Strother Moore. Kluwer Academic Publishers, June, 2000. (ISBN: 0-7923-7744-3)

5. Term Rewriting and All That. Franz Baader and Tobias Nipkow. Cambridge University Press, 1998. (ISBN: 0-521-77920-0)

6. Model Checking. Edmund M. Clarke, Jr., Orna Grumberg, and Doron A. Peled. MIT Press, 1999. (ISBN: 0-262-03270-8)

BITP 3253 Software Verification and Validation (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the principle of verification and validation focussing on testing the software as well as quality assurance.
2. Develop test requirements, test cases and test script for real software projects.
3. Classify the test design techniques and tools that could satisfy the quality of software products.

Synopsis

This course gives exposure to the students about the software testing concept and focus on process to develop and implement testing plan, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activity such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation.

References

1. Andreas Spillner et al.(2011), Software Testing Foundations, 3rd edition, January 2011, 296 pages, ISBN: 978-1-933952-78-9

2. Muller, Thomas et. al., (2007) ISTQB Certified Tester: Foundation Course in Software Testing. International Software Testing Qualification Board.

3. Cem Kaner, James Bach, Bret Pettichord (2002) Lessons Learned in Software Testing: A Context-Driven Approach, ISBN: 978-0-471-08112-8

4. Khan, RA., Mustafa K., Ahson, SI.,(2006).Software Quality: Concepts and Practices. Alpha Science.

BACHELOR OF COMPUTER SCIENCE (COMPUTER SECURITY) WITH HONOURS

COURSE LEARNING OUTCOMES

A bachelor's degree course in Computer Science, B.Sc. (Computer Security) (Honours) is aimed to produce highly knowledgeable and skillful graduates in the field of security related to computer science and information technology. Graduates are competent in advanced specialized knowledge and skill to analyze, design, install, configure, implement, administer, maintain and monitor the security infrastructure.

LEARNING OUTCOMES

The aim of FTMK's Bachelor of Computer Science (Computer Security) degree program is to produce students with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to analyze, create, assemble, configure, implement, manage, maintain and administer network infrastructure and security.
iv. Able to analyze and design the physical and cybersecurity policy.
v. Able to obtain recognition from professional bodies.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

The graduates can be employed in the government and private sectors as well as undertaking business ventures of their own. The positions suitable for the graduates including Information Technology Executive, System Analyst, Network Security Manager/Administrator, System Security Manager/Administrator, IT Project Manager, Network Security Engineer, Network Security Executive, System/Network Security Consultant, Researcher.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Computer Security) degree. The programme consists of components as follows:

Components	Credit Hours
University Compulsory Subjects	18
Program Core Subjects	66
Course Core Subjects	24
Elective subjects	12
TOTAL	120

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations– TITAS
BLHW 2 712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English For Professional Communication
**BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (66 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITP 1113	Programming Technique
BITP 1123	Data Structure and Algorithm
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITP 3113	Object Oriented Programming
BITP 2213	Software Engineering
BITS 1123	Computer Organization and Architecture
BITS 1213	Operating System
BITS 1313	Data Communication and Networking
BITM 1113	Multimedia System
BITI 1113	Artificial Intelligence
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II

COURSE CORE SUBJECTS (24 credits)

BITS 2343	Computer Network
BITS 2413	Network Security Infrastructure and Design
BITS 2523	Cyber Law and Security Policy
BITS 2423	Physical Security and Electronic Surveillance
BITS 3353	Network Security Administration and Management
BITS 3363	Network Security Project Management
BITS 3523	Computer Audit and Risk Management
BITS 3613	Hacking Techniques and Prevention

ELECTIVE SUBJECTS (12 credits)

Choose any 4 (FOUR) from the following.

BITS 3443	Digital Forensics
BITS 3453	Malware Analysis and Digital Investigation
BITS 3463	Cryptography Application and Information Theory
BITS 3473	Watermarking and Steganography
BITS 3513	TCP/IP Programming
BITS 3533	Wireless Network and MobileComputing
BITS 2513	Internet Technology
BITM 2113	Web Application Development

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 1702	Islamic and Asian Civilizations	2	0	2	
BITI 1213	Linear Algebra and Discrete Mathematics	2	2	3	
	Programming Technique				
BITP 1113	Computer Organization and Architecture	2	2	3	
BITS 1123	Multimedia System	2	2	3	
	Co-Curriculum I**				
BITM 1113	Third Language	2	2	3	
BKK- ----		0	3	1	
BLHL ----		1	2	2	
Total				17	

Note: BLHW 1702 Islamic and Asian Civilizations (local) is replaced with BLHW 1942 Malaysia Studies for International students.
**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.

Year One (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 2403	Technical English	3	0	3	
BITI 1223	Calculus and Numerical Methods	2	2	3	
BITP 1123	Data Structure and Algorithm	2	2	3	BITP 1113
BITS 1313	Data Communication and Networking	2	2	3	
BITM 2313	Human Computer Interaction	2	2	3	
BITP 1323	Database	2	2	3	
Total				18	

Year Two (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK- ----	Co-Curriculum II **	0	3	1	
BTMW 4012	Technology Entrepreneurship	2	0	2	
BITU 2913	Workshop 1	0	9	3	
BITI 2233	Statistics and Probability	2	2	3	
BITI 1113	Artificial Intelligence	2	2	3	
BITS 1213	Operating System	2	2	3	
BITS 2343	Computer Network	2	2	3	
Total				18	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.

Year Two (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITP 3113	Object Oriented Programming	2	2	3	BITP 1123
BITP 2213	Software Engineering	2	2	3	
BITS 2423	Physical Security and Electronic Surveillance Network Security Infrastructure and Design	2	2	3	
BITS 2413	Cyber Law and Security Policy	2	2	3	
BITS 2523	Elective 1	2	2	3	
BIT- ----		2	2	3	
Total				18	

Year Three (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BHLW 2712	Ethnic Relations	2	0	2	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITS 3353	Network Security Administration and Management	2	2	3	
BITS 3363	Network Security Project Management	2	2	3	
BIT- ----	Elective II	2	2	3	
BIT- ----	Elective III	2	2	3	
Total				17	

Note: BLHW 2712 Ethnic Relations replace with BLHW 2752 Malaysian Culture (for international students).

Year Three (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHC 4032	Critical and Creative Thinking	2	0	2	
BLHW 3403	English for Professional Communication	3	0	3	
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BITS 3523	Computer Audit and Risk Management	2	2	3	
BITS 3613	Hacking Techniques and Prevention	2	2	3	
BIT- ----	Elective IV	2	2	3	
Total				17	

Year Three (Special Semester)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
Total				3	

*Equivalent to 25 hours of Self-Learning Time

Year Four (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	
BITU 3946	Industrial Training Report	0	24	6	
Total				12	

Note: Pre requisite (completed all subject + MUET Band 2)

Elective Subjects

Below is a list of elective subjects can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subject given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITS 3443	Digital Forensics	2	2	3	
BITS 3453	Malware Analysis and Digital Investigation	2	2	3	BITS 3443
BITS 3463	Cryptography Application and Information Theory	2	2	3	
BITS 3473	Watermarking and Steganography TCP/IP Programming	2	2	3	BITS 3463
BITS 3513	Wireless Network and Mobile Computing	2	2	3	BITP 1113
BITS 3533	Internet Technology	2	2	3	BITS 1313
BITS 2513	Web Application Development	2	2	3	
BITM 2113		2	2	3	

List of elective subjects offered will be modified from time to time in accordance with industry needs.

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
B L HL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completion this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Discrete Mathematics. Topics for Linear Algebra include linear equations, matrices, determinants,vectors in R^n, real vector spaces, eigenvalues, linear transformation, and introduction to linear programming. Topics for discrete mathematics consist of logics, sets, function, algorithms, integers, mathematical reasoning, counting, relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus and Numerical Methods (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems

Synopsis

This course covers two areas of mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part topics consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References

1. Atkinson, K. and Han, W., 2004. *Elementary Numerical Analysis, 3rd* Ed., New York: John Wiley & Sons.
2. Atkinson, K., Han, W. Stewart, D.E., 2009. *Numerical Solution of Ordinary Differential Equations*., New Jersey: John Wiley & Sons.
3. Faires, J.D. and Burden, R.L., 2011. *Numerical Analysis*, 9th Ed., Boston: Brooks/Cole.

4. Fowler, J. and Snapp, B., 2014. *MOOculus Calculus* [online] Available at: https://mooculus.osu.edu [Accessed on 28 January 2015].

5. Heinbockel, J.H., 2012. *Introduction to Calculus* [online] Available at www.math.odu.edu/~jhh/Volume-1.PDF [Accessed on 28 January 2015].

6. Varberg,D., Purcell, E. J., and Rigdon,S.E., 2007. *Calculus,* 9th Ed., New Jersey: Pearson Education.

BITI2233 Statistics And Probability (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate understanding of the concept and fundamentals of statistics and probability.
2. Reproduce solutions for application problems using statistical software.
3. Solve application problems using appropriate statistical techniques.

Synopsis

This course will provide a comprehensive introduction to statistics and probability for computer science students. Topics that will be covered in this course includes data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distribution. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing, estimation and hypothesis testing for two populations, simple linear regression and correlation, and one-way ANOVA. In this course, students are guided to use statistical software to perform descriptive and inferential statistics analysis.

References

1. Navidi, W., (2014), "Statistics for Engineers and Scientists", 4th Edition,McGraw-Hill Education.

2. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), "Probability and Statistics for Engineers & Scientist", 9th Edition, Pearson Educational International.

3. Devore, J. L., (2011) "Probability and Statistics for Engineering and the Sciences", 8th Edition, Thomson.

4. Montgomery, D. C., Runger, G. C.,(2011), "Applied Statistics and Probability for Engineers", 3rd Edition, John Wiley.

5. Johnson, R., Freund, J., Miller, I., (2011), "Probability and Statistics for Engineers, 8th Edition", Pearson Educational International.

6. Mann, P. S., (2013), "Introductory Statistics", 8th Edition, Wiley.

7. Sh. Sara, Hanissah, Fauziah, Nortazi, Farah Shahnaz (2008), "Introduction to Statistics & Probability A Study Guide", Pearson Educational International.

BITP 1113 Programming Technique (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and

operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.

2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.

3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.

4. Liang, Y. D.(2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.

5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition",Pearson.

BITP 1123 Data Structure and Algorithm (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation.
2. Apply the suitable data structures for an application that requires data structures.
3. Construct the data structures and algorithms in problem solving.

Synopsis

This course introduces the students to data structures and algorithms. The basic concepts in structure, class, array and pointer are discussed in order to understand the fundamental of data structures and algorithms. The course focuses on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics cover the algorithms. This also includes the algorithm efficiency for run time. Pseudo code and C++ programming language will be used in algorithm implementation. Apart from the theory, the students are asked to apply the data structures and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "C++ Programming: Program Design Including Data Structures". 7th, edition, Cengage Learning, 2014.

2. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++",4thEdition, Addison Wesley, 2011.

3. Michael T. Goodrich, Roberto Tamassia& David M. Mount,"Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.

4. Goodrich, M. T.,Tamassia, R. and Mount, D. M. (2011).Data structures and algorithms in C++.2nd edition, Hoboken, NJ, Wiley.

5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITM 2313 Human Computer Interaction (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Julie A. Jacko Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, Third Edition (Human Factors and Ergonomics), CRC Press 2012.

2. Ben Shneiderman et al, Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition), 2009.

3. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (2nd Edition), John Wiley & Sons, 2007.

4. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.

BITP 1323 Database (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA).
2. Construct a relational database according to user requirements.
3. Solve simple and complex queries using Structured Query Language.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.

4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITP 3113 Object Oriented Programming (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the Relationsship among classes.
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.
3. Perform implementation of classes and Methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs.

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures, GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop a complete Java applications with database.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.

2. Deitel, H. M. & Deitel, P. J., Java How To Program, 10th Ed., Pearson Education International, 2014.

3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.

4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.

5. Cadenhead, Rogers, Java in 24 Hours, Sams Teach Yourself (Covering Java 8) (7th Edition), SAMS, 2014.

6. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015.

BITP 2213 Software Engineering (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Apply the concept of software engineering for system development.
2. Explain the principles and practices of software engineering in the system development.
3. Follow the standard guideline to produce formal specifications and software modeling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Sommerville, I., Mac 2015, Software Engineering, 10th Edition, Addison-Wesley.

2. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.

3. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.

4. Chemuturi, M. And Caghley, T. M. J., 2010, Mastering Software Project Management: Best Practices, Tools and Techniques, J. Ross Publishing.

5. Bruegge, B. and Dutoit, A. H., 2010, Object-oriented Software Enginering: Using UML, patterns and Java, Prentice Hall

6. Pressman, Roger S., 2010, Software Engineering: A Practitioner's Approach, Seventh (7th) Edition, McGraw-Hill.

7. Ahmad, S. et al, (2013), A Student's Guide: UML for Software Engineering, Penerbit UTeM.

BITS 1123 Computer Organization and Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input / Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013). *Computer Organization and Design: The Hardware/Software Interface, 5th Edition*. Morgan Kauffman.

2. Linda Null and Julia Lobur (2014). The *Essentials of Computer Organization and Architecture,* 4th *Edition*. Jones & Bartletts Pub.

3. Syarulnaziah, Zakiah, Marliza., Aslinda. *Lab Module: Computer Organization and Architecture With MIPS Programming.*

4. William Stallings, (2013). *Computer Organization and Architecture, 9th Edition.* Pearson.

5. Andrew S. Tanenbaum, (2013). *Structured Computer Organization 6th Edition*. Prentice Hall.

6. Irv. Englander (2014).*The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.*John Wiley & Sons.

BITS 1213 Operating System (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts, theory and technology used in operating system.
2. Demonstrate the major components and functionalities of an operating system.
3. Display the basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading.

Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.
2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed. Addison-Wesley.
3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.
4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.
5. Md Shah, W., Anawar, S., and Zakaria, NA., (2016). Ubuntu: Guide for Basic Administration, Module 23, Penerbit Universiti, UTeM.
6. www.ubuntu.com

BITS 1313 Data Communication and Networking (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Build the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Manipulate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understand the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and apply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring basic computer networks using guided or unguided media.

References

1. Forouzan, Behrouz A., 2012. *Data Communications and Networking*, 5th Edition, McGraw-Hill.
2. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. *Lab Companion: Data Communications and Networking*, 1st Edition.
3. William Stallings, 2013. *Data and Computer Communications*, 10th Edition, Pearson.
4. Massoud Moussavi, 2011. *Data Communication and Networking: A Practical Approach*, 1st Edition, Cengage Learning.
5. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, *Business Data Communications and Networking*, 12th Edition, Pearson
6. Bahaman, Nazrulazhar, Hamid, Erman and Mat Ariff, Azman, 2013. *Data Communications and Networking: Practical Approach*, 3rd Edition, Venton.
7. Curt M. White, 2012. Data Communications and Computer Networks, Cengage Learning

8. Randall J. Boyle, Jeffrey A. Clements, 2013. *Applied Networking Labs,* 2nd Edition, Prentice Hall

BITM 1113 Multimedia System (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Interpret the core concept of multimedia elements (C2, P1).
2. Construct multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs (C3, LL2).
3. Demonstrate problem solving skills for multimedia project development (P2, A1, CTPS1).

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D/3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communcation skills while performing their various tasks and project. Cooperative Learning (CL), Problem Based Learning (PBL), Cooperative Learning and Collaborative Learning approach will be used to enhance student's capability such as competency, attitude, knowledge and communication skills.

References

1. Norasiken, B., Huoy, C. Y., Mohamad Lutfi, D., Farah, N. A. & Ahmad, N. C. P., (2014), Multimedia System, University Technical Malaysia Melaka, Module.

2. Vaughan, T., (2014), Multimedia: Making It Work 8th Edition (Ninth Edition), McGraw-Hill Osborne Media.

3. Philips, R., (2013), The Developer's Handbook to Interactive Multimedia, Routledge – Taylors & Francis Group.

4. Burg, J., (2009), The Science of Digital Media, Prentice Hall.

5. Li, Z., Drew, M. S., and Liu, J., (2014) Fundamental of Multimedia (Second Edition), Springer.

BITI 1113 Artificial Intelligence (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the definition of Artificial Intelligence and its techniques.
2. Classify the types of Artificial Intelligence techniques.
3. Follow the Artificial Intelligence techniques in problem solving.

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References

1. Russel, S & Norvig, P. (2010). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
2. Luger, G. F. (2015). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Pearson Education.
3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
4. Kopec, D, Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

BITU 2913 Workshop I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually.
2. Identify and solve problems in systematic way.
3. Defend while presenting result of the project.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. Workshop 1 is also functioned as the platform to prepare the students for their industrial training program.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.
2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son.
3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.
4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.
5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of

problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives.
2. Practise the knowledge and skills that they have learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.
4. Report technical tasks performed into a technical journal.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Report on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review.
2. Develop project using an appropriate method.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3, 0, 25)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has potential commercial value.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

COURSE CORE SUBJECTS

BITS 2343 Computer Network (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Determine the basic concepts, elements and uses of Local Area Network (LAN) and Wide Area Network (WAN).
2. Demonstrate the ability to install, configure and operate networking hardware and software such as router, switch and Wireshark.
3. Justify the alternatives that exist in the selection of hardware, software and transmission facilities from

different resources when designing and implementing network in a project.

Synopsis

This course is an introduction to the current methods and practices in the use of Local and Wide Area Networks. The emphasis will be placed on LAN hardware and software, installation management and connection to other networks. Topics covered include network architecture, network communication protocols, end-to-end protocol stacks, network components, network management and the Open Systems Interconnection (OSI) reference model. Furthermore, Wide Area Network technologies such as Ethernet, Token Ring, ATM and FDDI also will be covered.

References

1. Andrew S. Tanenbaum , David J. Wetherall, “Computer Networks”, 5th Edition, Prentice Hall, 2011, ISBN: ISBN-10: 0-13-212695-8

2. James F. Kurose, Keith W. Ross, “Computer Networking: a top-down approach”, Addison-Wesley, 2010, ISBN: 0136079679

3. Andrew S. Tanenbaum, "Computer Networks”, Fourth Edition, Prentice Hall, Pearson Education, 2003, ISBN 0-13-038488-7

4. Todd Lammle, CCNA Cisco Certified Network Associate, Wiley (2005). ISBN: 0-7821-4391-1

5. Forouzan, Behrouz. A., Local Area Networks, McGraw-Hill Forouzan Networking Series(2003), ISBN 0-07-233605-6

6. Patrick Regan, “Wide Area Network”, Pearson Prentice Hall (2004), ISBN : 0-13-046578-X

7. Rick Graziani and Bob Vachon, 2008, Accessing the WAN: CCNA Exploration Companion Guide, CISCO Press.

BITS 2413 Network Security Infrastructure and Design (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Elaborate the importance of network implementation in a secure infrastructure.
2. Construct the network topology with or without the cyber security policy.
3. Develop skills and knowledge in various settings and platforms to ensure a highly secured network infrastructure.

Synopsis

This course is designed to provide fundamental knowledge in planning and designing a secure network infrastructure. Topics covered include how to analyze security policies, procedures, and requirements as well as how to identify and design for potential security threats. Students will also be exposed to designing a network infrastructure security, authentication strategy for the organisation domain, access control strategy for network resources and public key infrastructure with certificate services. They will also be involved in designing security for internet information services, servers with specific roles, as well as designing an infrastructure for updating computers and secure network management infrastructure.

References

1. Merike Kaeo, “Designing Network Security”, 2nd Edition, Cisco Press, 2003, ISBN: 978-1587142499

2. Shinder, T.W., Diogenes, Y., Littlejohn Shinder, D., “Windows Server 2012 Security from End to Edge and

Beyond, 1st Edition, Syngress, 2013, ISBN: 9781597499811

3. Santhosh Sivarajan, "Getting Started with Windows Server Security". Packt Publishing, 2015, ISBN: 9781784398729

4. Sumit Ghosh, Principles of Secure Network Systems Design, Springer, 2002, ISBN 0387952136, 9780387952130

5. David I. Bainbridge, "Introduction to Computer Law", 5th Edition, Pearson Education, 2004, ISBN: 9780582473652

6. Santos, O., Stuppi, J., "CCNA Security 210-260 Official Cert Guide", Cisco Press, 2015, ISBN: 1-58720-566-1.

7. Priscilla O., "Top-down Network Design", 3rd Edition: 2, Cisco Press, 2010, ISBN 1-58720-283-2

BITS 2523 Cyber Law and Security Policy (3, 2, 2)

Learning Outcomes

Upon completion of this subject, students should be able to:

1. Describe the concept of Cyber Law, Security Policy, Intellectual Property, Acts and Laws, specific policies and ethical issues in cyber world.
2. Explain the scope of protection covered by each type of Cyber Law.
3. Construct security policies based on related Acts and Laws.

Synopsis

This course is designed to provide fundamental skills needed to understand cyberlaws related to copyright, patents, digital rights, computer crimes, privacy issues, hacking and prosecution in Malaysia. This course will also covers the scope and enforcement bodies in Malaysia. Furthermore, students will be exposed to design and produce security policies accordance with legal laws.

References

1. Zeinab Karake Shalhoub and Sheikha Lubna Al Qasimi, "Cyber law and cyber security in developing and emerging economics", Edward Elgar Publishing, 2010.

2. Jeffrey A. Helewitz, "Cyberlaw: Legal Principles of Emerging Technologies", Prentice Hall, 2003

3. Matt Bishop, "Computer Security: Art and Science", Addison Wesley, 2003

4. Geoffrey Corn and Jimmy Gurule, "National Security Law: Principles and Policy", Wolters Kluwer Law & Business, 2015.

5. A Nash, W Duane, C Joseph, "PKI: Implementing and Managing E-Security", McGraw-Hill, 2001.

6. Robert Johnson, "Security Policies and Implementation Issues", Jones & Bartlett Learning; 2 edition, 2014.

BITS 2423 Physical Security and Electronic Surveillance (3, 2, 2)

Learning Outcomes

Upon completion of this subject, students should be able to:

1. Demonstrate methods in physical security and electronic surveillance.
2. Analyze and explains steps in producing policies of physical security and electronic surveillance.
3. Organize by using appropriate equipment in designing physical security and electronic surveillance.

Synopsis

This course is designed to provide fundamental knowledge in physical security and electronic surveillance. It addresses the threats, vulnerabilities, and countermeasures that can be utilized

to physically protect an enterprise's resources and sensitive information. These resources include people, the facility in which they work, and the data, equipment, support systems, media, and supplies they utilize. Topics cover protection techniques for the entire facility, from the outside perimeter to the inside office space, including all of the information system resources. These focus on the methods of recognition, anticipation, selection, and design of security technologies as well as examining the principles and applications of security systems.

References

1. Shon Harris, "All-in-one CISSP, 6th Edition", ISBN: 978-0-07-178173-2, McGrawHill Education, 2013.

2. Lionel Silverman, "Physical Security and Wireless Access Control Systems", Taylor and Francis Publisher, 2010.

3. Ross J. Anderson. "Security Engineering: A Guide to Building Dependable Distributed Systems, 2nd Edition, ISBN: 978-0-470-06852-6, Cambridge-Wiley, 2008

4. Brian T. Contos, William P Crowell, Colby Derodeff, Dan Dunkel, Eric Cole. "Physical and logical security convergence powered by enterprise security management". Syngress Publishing, Burlington, 2007

5. Houston H. Carr; Charles A. Snyder; Bliss N. Bailey "The Management of Network Security: Technology, Design, and Management Control" Prentice Hall, 2009

6. Robert Fischer Ph.D. and Richard Janoski, "Prevention and Security Procedures - Practical application for contemporary problems", Butterworth – Heinemann. 2000

7. Timothy Crowe, "Crime Prevention through Environmental Design - Applications of Architectural Design and Space Management Concepts", National Crime Prevention Institute.

8. C.A. Roper, "Physical Security and Inspection" (2000), Butterworth – Heinemann

BITS 3353 Network Security Administration and Management (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Analyse the principles, strategies and standard practices in network security administration and management.
2. Verify the system in operation is secured according to accepted industry practices, and in compliance with any specific organization policies and procedures.
3. Manipulate appropriate network tools for security monitoring, network administration and management in accordance to current scenario.

Synopsis

This course covers the topics in network security administration and management. The students will be equipped with the knowledge and praticality of a network security administrator/ manager. Together with the tools used in lab sessions and the skills trained, the students will be educated and qualified enough to be network security practitioners.

References

1. Security+ Guide to Network Security Fundamentals 4th Edition, 2011, Mark Ciampa, Course Technology

2. Guide to Computer Network Security, 2015, Joseph Migga Kizza, Springer

3. Network Flow Analysis, 2010, Michael Lucas, No Starch Press

4. Network Security and Management 3rd Edition, 2012, Brijendra Singh, PHI Learning

5. CISSP All in one Exam Guide 6th Edition, 2012, Shon Harris, McGraw-Hill Education

6. Principles of Computer Security – Lab Manual, 2014, Vincent Nestler et.al, McGraw-Hill Education

BITS 3363 Network Security Project Management (3, 2, 2)

Learning Outcomes

Upon completion of this subject, students should be able to:

1. Identify the processes, tools and techniques in network security project management.
2. Demonstrate the understanding of all the project management body of knowledge, processes, tools and techniques.
3. Organize projects that are related to information technology and computer network security in groups.

Synopsis

This course provides distinct knowledge in network security project management. The topics cover project management body of knowledge namely managing projects in aspects of integration, scope, time, cost, quality and human resource. It also covers the phases of network security project management namely project initiation, planning, executing, controlling and closing or termination. Software for security project management such as Microsoft Project and Microsoft Excel will be introduced and used to help in applying the network security project management knowledge areas and processes.

References

1. Schwalbe Kathy. *Information Technology Project Management*, 7*th Ed.* Cengage Learning. 2013.

2. Michael E. Whitman, Herbert J.Mattord, *Management of Information Security 3rd Edition*, Course Technology, 2010.

3. Joseph Phillips, *IT Project Management : On Track From Start To Finish Third Edition*, Mc-Graw Hill, 2010

4. Carl Chatfield & Timothy Johnson D. *Microsoft Project 2010 Step by Step. Microsoft Press. ISBN: 978-073-5626959,* 2010.

5. Paul E Harris, Planning and Control Using Microsoft Office Project and PMBOK Guide 4th Edition, Eastwood Harris, 2010

6. Larry Webber, Federick Webber, *IT Project Management Essentials,* Aspen Publisher, 2009

7. Susan Snedaker, *Syngress IT Security Project Management Handbook*, *6th Edition,* Syngress, 2006

BITS 3523 Computer Audit and Risk Management (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Analyze concepts and elements of computer audit and risk management.
2. Propose the suitable actions based on security issues in computer security audit.
3. Manipulate on audit and mechanisms in physical security, operating systems, networks, and administrations of computer security from various resources.

Synopsis

This course covers background views of the needs of audit and risk management. The course will cover fundamental of computer security management and fundamental of risk management. The topics covered are audit security aspect including security audit analysis, security monitoring, environmental security, and

security audit follow up. It also introduces student to the area of risk and incident response, recovery and disaster recovery.

References

1. Chris Davis, Mike Schiller, Kevin Wheeler, (2011), IT Auditing Using Controls to Protect Information Assets, 2nd Edition. ISBN 10: 0071742387 ISBN 13: 9780071742382, Mc-Graw Hill.

2. Alan Calder, Steve G Watkins, (2010), Information Security Risk Management for ISO27001 / ISO27002, ISBN 9781849280433, IT Governance Publishing.

3. Lance Hayden, (2010), IT Security Metrics : A Practical Framework for Measuring Security and Protecting Data, ISBN 9780071713405, Mc-Graw Hill

4. Ronald L. Krutz and Russell Dean Vines (2007), The CISSP and CAP Prep Guide, Wiley Publishing, ISBN 13: 978-0-470-00792-1

5. CISA Review Manual, 26th Edition 26th Edition (2015), ISACA, ISACA; 26 edition, ISBN-10: 1604203676

6. Diana Lynn, Douglas Andre, Eric Waxvik, Paul A Henry (2006), Official Guide to the SSCP CBK, Pearson, ISBN 13 978-983-3655-47-2.

7. Andy Jones, Debi Ashenden (2005), Risk Management For Computer Security, Butterworth-Heinemann, ISBN 0750677953, 9780750677950

8. Don Murdoch GSE, Blue Team Handbook: Incident Response Edition: A condensed field guide for the Cyber Security Incident Responder, CreateSpace Independent Publishing Platform; 2 edition, ISBN 978-1500734756

9. David L. Cannon, (2011), CISA: CISA Certified Information Systems Auditor Study Guide 3rd Edition, Sybex, ISBN-10: 0470610107

BITS 3613 Hacking Techniques and Prevention (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the fundamentals concept of hacking technique and prevention.
2. Applied the tools and methods to protect computers and networks against hacker attacks.
3. Measure the major software security design flaws such as buffer overflow and race condition and provide best practices for defending against attacks.

Synopsis

In this course, students will study and gain experience with the role of defending hosts and networks from attack as well as learning how the hacker uses tools to attack and penetrate networks. Students will be able to use several open software tools that will analyze host and networks for vulnerabilities and be exposed to the hacker technique of "thinking outside the box". It will immerse the student into an interactive environment where they will be shown how to scan, test, hack and secure their own systems. The lab intensive environment gives each student in-depth knowledge and practical experience with the current essential security systems. Students will begin by understanding how perimeter defenses work and then be lead into scanning and attacking their own networks, no real network is harmed. Students then learn how intruders escalate privileges and what steps can be taken to secure a system.

References

1. Sean-Philip Oriyano, CEH: Certified Ethical Hacker Version 8 Study Guide 1st Edition, Sybex, 2014

2. Engebretson, Patrick. The basics of hacking and penetration testing: ethical hacking and penetration testing made easy. Elsevier, 2013.

3. Matt Walker, CEH Certified Ethical Hacker Bundle, Second Edition (All-in-One) 2nd Edition, McGraw-Hill Education, 2014.

4. Peter Kim, The Hacker Playbook 2: Practical Guide To Penetration Testing, CreateSpace Independent Publishing Platform, 2015
5. Ali Jahangiri, *Life Hacking : The Ultimate Guide to Hacking Techniques and Countermeasures for Ehtical hackers and IT Security Experts*, Dr. Ali Jahangiri, 2009

6. Kevin Beaver and Stuart McClure, *Hacking For Dummies (For Dummies (Computers)) 5th Edition*, 2015

ELECTIVE SUBJECTS

BITS 3443 Digital Forensics (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Describe the concept of digital forensic and investigation.
2. Distinguish multi-operating system nuance with respect to digital forensics.
3. Manipulate the process of forensic investigation using particular tools by referring the digital forensic investigation methodology.

Synopsis

This course is an introduction to digital forensics reflects the need for conducting professional computing investigations. Students will explore general computer investigations, security issues with operating systems, setup and maintenance of a digital forensics lab, use of computer forensics tools, digital evidence controls, data acquisition and analysis, e-mail investigations, and the preparation of investigation report.

References

1. John Sammons, 2012, *the Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics*, Syngress, ISBN 978-1597496612

2. Cory Altheide, Harlan Carvey, 2011, *Digital Forensics with Open Source Tools*, Syngress, ISBN 978-1597495868

3. Casey E, 2011. *Digital Evidence and Computer Crime*, 3rd Edition, Academic Press, ISBN–13: 978-0123742681

4. Nelson B., Phillips A., Enfinger F. and Steuart C., 2015. Guide to Computer Forensics and Investigations, 5th Edition, Thomson Course Technology, ISBN 978-1285060033

5. Marjie T. Britz, 2013. *The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics*, 3rd Edition, Prentice Hall, ISBN–13: 978-0132677714.

BITS 3463 Cryptography Application and Information Theory (3, 2, 2)

Learning Outcomes

Upon completion of this subject, students should be able to:

1. Differentiate the basic concept of probability theory, information theory, complexity theory, number theory, abstract algebra and finite fields.
2. Build symmetric systems, asymmetric systems and cryptanalysis in cryptography.
3. Illustrate on the usage of information theory in cryptographic system.

Synopsis

This course covers the probability theory concept, information theory, complexity theory, number theory, abstract algebra and finite fields to understand the ideas regarding the discrete log problem, strength of an algorithm, information security, encryption, decryption, symmetric systems, asymmetric systems and cryptanalysis in cryptography. The symmetric and asymmetric cryptosystems and its cryptographical mathematical theory behind it are emphasized.

References

1. Robert M. Gray, Entropy and Information Theory, 2nd Ed., Springer, 2011.
2. William Stallings, Cryptography and Network Security: Principles and Practice, 5th Ed., Prentice Hall, 2011.
3. Abhijit Das and C. E. Veni Madhavan, Public-Key Cryptography: Theory and Practice, Pearson 2009.
4. Harald Niederreiter and Chaoping Xing, Algebraic Geometry in Coding Theory and Cryptography, Princeton University Press, 2009.
5. Ranjan Bose, Information Theory, Coding and Cryptography, 2nd Ed., McGraw Hill, 2008
6. Douglas Robert Stinson, Cryptography: Theory and Practice, Chapman & Hall/CRC, 3rd Ed., 2006.

BITS 3473 Watermarking and Steganography (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Determine and explain basic techniques of digital watermarking for embedding an ownership code and steganography (hiding information) to do digital image and audio processing.
2. Manipulate the types of digital watermarking techniques based on characteristics as well as applications using media editing platform.
3. Differentiate the mechanism of current and future intellectual property management and protection of multimedia.

Synopsis

This subject prepares students with the basic concept of digital watermarking and steganography. It covers the introduction to the theoretical background needed to develop and implement basic techniques and algorithms in digital watermarking and steganography. In the lab session, students will be introduced to tools for selected media element and editing software for embedding information in the media. Students will be trained for practical embedding on text documents, still image, audio sound and video. Students will be exposed to teamwork, leadership, problem-solving and communication skills while performing their various tasks and project.

References

1. Fridrich, J. (2015). *Steganography in digital media:* Cambridge University Press.
2. Lin, Y., & Abdulla, W. H. (2014). *Audio Watermark: A Comprehensive Foundation Using MATLAB*. Springer International Publishing.
3. Wang, F. H. (2012). *Innovations in Digital Watermarking Techniques*. Springer Berlin Heidelberg.
4. Wayner, P. (2009). *Disappearing Cryptography: Information Hiding : Steganography & Watermarking*. Morgan Kaufmann Publishers.
5. Cheddad, A. (2009). *Digital Image Steganography*. VDM Publishing.
6. Cox, I. J. (2008). *Digital Watermarking and Steganography*. Morgan Kaufmann Publishers.
7. Shih, F. Y. (2007). *Digital Watermarking and Steganography: Fundamentals and Techniques*. CRC Press.

BITS 3513 TCP/IPProgramming (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate various techniques and concepts of network programming.
2. Discover several common programming interfaces for network communication.
3. Manipulate advanced knowledge of programming to solve the network programming problem.

Synopsis

This subject intended to expose student on how network programming works. Since Java is one of the most demanding skill in industry, so this subject will emphasize on how to write a network programming by using Java language. This subject will show students on how to use Java's network class library to quickly and easily write programs that accomplish many common networking tasks.

References

1. Elliotte Rusty Harold, Java Network Programming 4th Edition, O'Reilly & Associates. (2013)

2. Jan Graba, An Introduction to Network Programming with Java 3rd Edition, Springer (2013)

3. Esmond Pitt, Fundamental Networking in Java, Springer (2006).

4. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSP, 2nd Edition, O'Reilly Media (2008)

BITS 3533 Wireless Network & Mobile Computing (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate standards of cellular telecommunication and wireless networks.
2. Identify different types of wireless network, its protocols, and applications.
3. Construct online applications utilizing wireless networks technologies.

Synopsis

This course is designed to give the knowledge of the concept of mobile computing and wireless networks, by exploring the relationship between hardware, software and development kits. Through class, research and application development, students will understand the current mobile technology and the relation to operating systems and standards. Students will be exposed to the challenges to handle the constraints of memory and storage of these hardware.

References

1. Molisch, Andreas F., Wireless Communications, ISBN : 978047041870, John Wiley & Sons, 2011

2. Arshdeep Bahga, Vijay Madisetti, Internet of Things (A Hands-on-Approach), ISBN: 0996025510, VPT Aug 2014.

3. Paul Bedell, Cellular Networks: Design and Operation – A Real World Perspective, ISBN: 1478732083, Outskirts Press Aug 2014.

4. Mr Mark A Lassoff, Mr Tom Stachowitz, Mobile App Development with HTML5, ISBN: 0692405054, LearnToProgram, Incorporated Mar 2015.

5. Erik Dahlman, Stefan Parlvall, Johan Skold, 4G: LTE/LTE-Advanced for Mobile Broadband, ISBN: 012385489X, Academic Press, 2011.

6. Thomas J. Duffy, Programming with Mobile Applications: Android(TM), iOS, and Mobile Phone 7, ISBN: 1133628133, Course Technology, 2012.

BITS 2513Internet Technology (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Discover the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Select the system requirements aligned with the current technology advancement.
3. Display the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web-based knowledge also contribute to this phenomenon. This course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study include: basic concepts and client, networking, programming on the Internet, security and Internet applications.

References

1. James F.Kurose and Keith W. Ross, (2012). Computer Networking: A Top-Down Approach. 6th Edition, Pearson.

2. Brian Williams, Stacey Swayer (2010). Using Information Technology 9e Complete Edition. Career Education.

3. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing.

4. Douglas E. Comer (2007). The Internet 4th edition. Pearson Prentice Hall.

5. Preston Gralla (2006). How Internet Works 8th edition. Que Publishing

6. Fred T. Hofstetter (2005), Internet Technologies at Work, McGraw Hill Technology Education

7. Wahidah, Robiah, Siti Rahayu, Nurul Azma and Norharyati (2015). Internet Technology: Lab Companion. Penerbit Universiti, UTeM.

BITM 2113 Web Application Development (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Describe the concept of Cyber Law, Security Policy, Intellectual Property, Acts and Laws, specific policies and ethical issues in cyber world.
2. Explain the scope of protection covered by each type of Cyber Law.
3. Construct security policies based on related Acts and Laws.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are

- Client Site Technologies: HTML, CSS, XML, and JavaScript
- Server Site Technologies: PHP
- Database Server: MySQL.
- Web Servers : Apache

References

1. Robert W.Sebesta (2015), Programming The World Wide Web – 8th Edition, Pearson, ISBN:0133775984
2. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5) 4th Edition. O'Reilly Media. ISBN-13: 978-1491918661.
3. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.
4. Keith Darlington (2005), Effective Website Development – Tools and Techniques, Addison Wesley, ISBN: 0-321-18472-6
5. Luke Welling, Laura Thomson (2008), PHP and MySQL Web Development – 4th Edition, Addison-Wesley, ISBN: 0672329166

BACHELOR OF INFORMATION TECHNOLOGY (GAME TECHNOLOGY) WITH HONOURS

COURSE LEARNING OUTCOMES

Bachelor of Information Technology (Game Technology) academic programme is offered to produce knowledgeable and skillful graduates in information technology particularly in the area of computer games technology that includes both entertainment and educational 'serious games' industry. The learning outcomes of the this programme are as follows:

i. To equip the students with the basic knowledge in every aspect of computer games technology.
ii. To provide the students with sufficient theoretical knowledge and skills to apply the knowledge learnt through the practiced concept.
iii. To enable the students to be able to apply the interactivity concept in the design and development of computer games.
iv. To equip the students with deep understanding and high skills in the development and management of computer games.
v. To produce graduates that are capable to develop high quality interactive games products and games applications which fulfill the industry specifications.

LEARNING OUTCOMES

The purpose of FTMK offering the Bachelor of Information Technology (Game Technology) is to produce students with the following qualities:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to apply interactivity concept in designing and developing interactive games technique.
iv. Able to apply the knowledge and practice of interactive game development process using various software and tools.
v. Able to develop interactive games with the quality that fulfills industry specifications.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have entrepreneurship skills.
ix. Able to perform continuous self learning to obtain knowledge and skills.

CAREER PROSPECTS

This course is offered to produce graduates who are highly knowledgeable and skilled in the field of computer games technology. The graduates are well equipped with knowledge and specific skills such as computer game programming, design and develop various types of computer games, the principle of games, web-based games, project management as well as 2D and 3D game development. Graduates of this course are able to contribute their expertise and skills to the education and entertainment industri such as game-based education and game content development.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Information Technology (Game Technology) degree.The programme consists of components as follows:

Components	Credit Hours
University Compulsory Subjects	18
Program Core Subjects	51
Course Core Subjects	39
Elective subjects	12
TOTAL	120

UNIVERSITY COMPULSORY SUBJECTS (18 credits)

BTMW 4012	Technology Entrepreneurship
BLHW 1702	Islamic and Asian Civilizations– TITAS
BLHW 2712	Ethnic Relations
BLHW 2403	Technical English
BLHW 3403	English for Professional Communication
**BLHC 4032	Critical and Creative Thinking
BLHL - - - -	Third Language
BKK* - - - -	Co-Curriculum I
BKK* - - - -	Co-Curriculum II
BLHL 1012	Bahasa Melayu Komunikasi (International)
BLHW 1942	Malaysia Studies (International)
BLHW 2752	Malaysian Culture (International)

PROGRAMME CORE SUBJECTS (51 credits)

BITI 1213	Linear Algebra and Discrete Mathematics
BITI 1223	Calculus and Numerical Methods
BITI 2233	Statistics and Probability
BITM 2313	Human Computer Interaction
BITP 1323	Database
BITS 1123	Computer Organization and Architecture
BITS 1313	Data Communication and Networking
BITS 1213	Operating System
BITE 2123	Artificial Intelligence for Games
BITU 2913	Workshop I
BITU 3923	Workshop II
BITU 3926	Industrial Training
BITU 3946	Industrial Training Report
BITU 3973	Final Year Project I
BITU 3983	Final Year Project II

COURSE CORE SUBJECTS (39 credits)

BITE 1613	2D Game Development
BITE 2633	Audio Video Production for Game
BITE 2613	Interactive 3D Animation
BITE 1513	Game Programming I
BITE 1523	Computer Game Programming II
BITE 1713	Game Architecture
BITE 2513	Game Engine Development I
BITE 3713	Multi-platform Game
BITE 1723	Computer Game Design Principles
BITE 2523	Web Game Development
BITE 3613	Game Project Management
BITE 2623	3D Game Development
BITE 3513	Game Engine Development II

ELECTIVE SUBJECTS (12 credits)

Choose any 4 (FOUR) from the following.

BITE 3523	Game Physics
BITE 3723	Game Mechanics
BITE 3623	Motion Graphics
BITE 3633	Game Play
BITS 3423	Information Technology Security
BITS 3333	Multimedia Networking

CURRICULUM STRUCTURE PER SEMESTER

Year One (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITE 1723	Computer Game Design Principle	2	2	3	
BLHL ----	Third Language	1	2	2	
BITI 1213	Linear Algebra and Discrete Mathematics	2	2	3	
BITE 1513	Game Programming I	2	2	3	
BITS 1123	Computer Organization and Architecture	2	2	3	
BITS 1213	Operating System	2	2	3	
	TOTAL			17	

Note: 1. BLHW 1702 Islamic and Asian Civilizations (local) is replaced with BLHW 1942 Malaysia Studies for International students.
2. BLHW 2712 Ethnic Relations replace with BLHW 2752 Malaysian Culture (for international students).

Year One (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 1702	Islamic and Asian Civilizations	2	0	2	
BLHW 2403	Technical English	3	0	3	
BITI 1223	Calculus and Numerical Methods	2	2	3	
BITE 1523	Computer Game Programming II	2	2	3	
BITP 1323	Database	2	2	3	
BITE 1613	2D Game Development	2	2	3	
	TOTAL			17	

Note: International Student Only. BLHW 1942 Malaysian Studies for International Student.

Year Two (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 2712	Ethnic Relations	2	0	2	
BITU 2913	Workshop I	0	9	3	
BLHC 4032	Critical and Creative Thinking	2	2	2	
BITS 1313	Data Communication and Networking	2	2	3	
BITE 2513	Game Engine Development I	2	2	3	
BKK - ----	Co-Curriculum I **	0	3	1	
BITE 1713	Game Architecture	2	2	3	
	TOTAL			17	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.
Note: International Student Only. BLHW 2752 Malaysian Culture.

Year Two (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BKK - ----	Co-Curriculum I **	0	3	1	
BITE 2633	Audio Video Production for Game	2	2	3	
BIT- ----	Elective I	2	2	3	
BITM 2313	Human-Computer Interaction	2	2	3	
BITI 2233	Statistics and Probability	2	2	3	
BITE 2123	Artificial Intelligence for Games	2	2	3	
BITE 2613	Interactive 3D Animation	2	2	3	
	TOTAL			19	

***This subject can be taken in any semester. Please refer to co-curriculum unit before registered.*

Year Three (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHW 3403	English For Professional Communication	3	0	3	
BITE 3513	Game Engine Development II	2	2	3	
BITU 3923	Workshop II	0	9	3	BITU 2913
BITE 3713	Multi-platform Game	2	2	3	
BITE 2523	Web Game Development	2	2	3	
BIT- ----	Elective II	2	2	3	
	TOTAL			18	

Year Three (Semester II)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BTMW 4012	Technology Entrepreneurship	2	0	2	
BITU 3973	Final Year Project I	0	9*	3	BITU 3923
BIT- ----	Elective III	2	2	3	
BIT- ----	Elective IV	2	2	3	
BITE 3613	Game Project Management	2	2	3	
BITE 2623	3D Game Development	2	2	3	
	TOTAL			17	

*Equivalent to 25 hours of Self-Learning Time

Year Three (Special Semester)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3983	Final Year Project II	0	9*	3	BITU 3973
	TOTAL			3	

*Equivalent to 25 hours of Self-Learning Time

Year Four (Semester I)					
Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITU 3926	Industrial Training	0	24	6	
BITU 3946	Industrial Training Report	0	24	6	
	TOTAL			12	

Note: Requisite (Completed all subjects + MUET band 2)

Elective Subjects

Below is a list of elective subjects can be selected by students as part of the curriculum program. Students will be given the option to choose any 4 (FOUR) of the subject given below.

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITE 3523	Game Physics	2	2	3	
BITE 3723	Game Mechanics	2	2	3	
BITE 3623	Motion Graphics	2	2	3	
BITE 3633	Gameplay	2	2	3	
BITS 3423	Information Technology Security	2	2	3	
BITS 3333	Multimedia Networking	2	2	3	
	TOTAL			12	

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BLHL 1012	Malay I	1	2	2	
BLHL 1112	Arabic I	1	2	2	
BLHL 1212	Mandarin I	1	2	2	
BLHL 1312	Japanese I	1	2	2	

PROGRAMME CORE SUBJECTS

BITI 1213 Linear Algebra and Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Explain the basic concepts and application of Linear Algebra.
2. Explain the basic concepts and application of Discrete Mathematics.
3. Solve problems based on the concept and the theories that have been learned.

Synopsis

This course covers two disciplines of Mathematics namely Linear Algebra and Discrete Mathematics. The topics for Linear Algebra are linear equations, matrices,
determinants, vectors in Rn, real vector spaces, eigenvalues, eigenvectors, diagonalization and linear transformation. The topics for discrete Mathematics includes logic, sets, function, algorithms, integers, Mathematical reasoning, counting, Relations, graphs, trees and Boolean algebra.

References

1. Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
2. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
3. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
4. Kenneth H. Rosen (2011), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.
5. Susanna, S. E. (2010), "Discrete Mathematics with Applications", 4th Ed.", Cengage Learning.
6. Cliff, L.S., Robert, D., Kenneth, B. (2010), "Discrete Mathematics for Computer Scientists: International Version", Pearson.

BITI 1223 Calculus And Numerical Methods (3, 2, 2)

Learning Outcomes

Upon completing this course, students should be able to:

1. Explain fundamental concepts of Calculus and Numerical Methods.
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools.
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems.

Synopsis

This course covers two areas of Mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References

1. Varberg,D.,Purcell, E. J., and Rigdon,S.E., Calculus 9th Edition, Pearson 2007
2. James Stewart, Calculus, Thomson, 2003.
3. Johnston, E.H., Mathews J.C., Calculus, Pearson Education, 2002.
4. Atkinson, K. and Han, W., Elementary Numerical Analysis, John Wiley & Sons, Inc., 2004.
5. Richard L.B. and Faires, D.J., Numerical Analysis, Thomson, 2004.

BITI 2233 Statistics and Probability (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the concepts of fundamental Statistics and probability.
2. Solve problems in Statistics inference related to hypothesis test using software.
3. Solve application problems using appropriate Statistics techniques.

Synopsis

Students will be introduced to the concept of probability and inferential Statistics. The course starts with Probability followed by Discrete Random Variables, Continuous Random Variables and Sampling Distribution. The main topics for Inferential statististics are Estimation, Hypothesis Testing, Estimation and Hypothesis Testing: Two Populations, Anova, Simple Linear Regression and CorRelations. This course will also provide the students with some exposure to Statistical software.

References

1. Tay,c.c , Hamzah,Sek.Y.W, Law. C.Y, Review On Statistics , 2011.
2. Douglas C. Montgomery, George C.Runger, Applied Statistics and Probability for Engineers, 5th Edition, 2010, John Wiley.
3. Richard A. Johnson, Probability and Statistics for Engineers, 8th Edition, 2010, Pearson Prentice Hall.
4. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, 2011 Thomson – Duxbury.
5. Sh. Sara, Hanissah, Fauziah, Nortazi, A Module of Statistics & Probability (2nd Edition), 2007.

BITM 2313 Human Computer Interaction (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application/web site/ product design.
3. Follow and respond to the usability evaluation activities.

Synopsis

This subject introduces the concept of HCI and its Relationsship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (4th Edition), John Wiley & Sons, 2015.
2. Alan Dix et al., Human-Computer Interaction (3rd Edition), Prentice Hall, 2005.
3. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.
4. Pepin Van Roojen et al, Sign and Symbols, The Pepin Press 2006.
5. Tom Frase et al, The Complete Guide To Colour, ILEX Press Limited, 2004.
6. Geri Hay et all, Activity-Centered Design: An Ecological Approach to Designing Smart Tools and Usability Systems, The MIT Press, 2004

BITP 1323 Database (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA).
2. Construct a relational database according to user requirements.
3. Solve simple and complex queries using Structured Query Language.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2015) Database Systems: Design, Implementation and Management with CB VitalSource eBook 11th Edition. Cengage Learning.

2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.

3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.

4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley

BITS 1123 Computer Organization and Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain computer architecture and organization concept including functional components, characteristics, performance and the detailed interactions in computer system including system bus, different types of memory and input/output and CPU.
2. Extend basic of logic circuits and its application in digital systems.
3. Use instruction set design and its application in microprocessor architecture.
4. Demonstrate the ability to assemble basic computer component.

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input/Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013. Computer Organization and Design: The Hardware/Software Interface, 5th Edition. Morgan Kauffman.

2. Linda Null and Julia Lobur (2014). The Essentials of Computer Organization and Architecture, 4th Edition. Jones & Bartletts Pub.

3. Aslinda, Fahmi, Nurul Azma, Zakiah and Zurina. Lecture Slides: Computer Organization & Arcitecture. Second Edition

4. Syarulnaziah, Zakiah, Marliza, Aslinda. Lab Module: Computer Organization and Architecture With MIPS Programming.

5. William Stallings, (2013). Computer Organization and Architecture, 9th Edition. Pearson.

6. Andrew S. Tanenbaum, (2013). Structured Computer Organization 6th Edition. Prentice Hall.

7. Irv. Englander (2014).The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.John Wiley & Sons.

BITS1313 Data Communication and Networking (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the understanding of data communication and networking concept and terminologies.
2. Differentiate types of network media, network topology and network technologies.
3. Demonstrate network configuration using guided and unguided media.

Synopsis

This course introduces the fundamental concepts and terminology of data communication and netwworking, encompassing both technical and managerial aspects and to help students better understand the challenges and oppurtunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry.

References

1. David A. Patterson and John L. Hennessy (2013. Computer Organization and Design: The Hardware/Software Interface, 5th Edition. Morgan Kauffman.

2. Linda Null and Julia Lobur(2014). The Essentials of Computer Organization and Architecture, 4th Edition. Jones & Bartletts Pub.

3. Aslinda, Fahmi, Nurul Azma, Zakiah and Zurina. Lecture Slides: Computer Organization & Arcitecture. Second Edition

4. Syarulnaziah, Zakiah, Marliza., Aslinda. Lab Module: Computer Organization and Architecture With MIPS Programming.

5. William Stallings, (2013). Computer Organization and Architecture, 9th Edition. Pearson.

6. Andrew S. Tanenbaum, (2013). Structured Computer Organization 6th Edition. Prentice Hall.

7. Irv. Englander (2014).The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition.John Wiley & Sons.

BITS 1213 Operating System (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Understand the basic concepts, theory and technology used in operating system.
2. Elaborate the major components and functionalities of an operating system.
3. Demonstrate basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2015), Operating Systems: Internals and Design Principles 8th Ed., Pearson Education Limited.

2. Silberschatz A., Galvin P.B. and Gagne G. (2013). Operating System Concept 9th.Ed., Addison-Wesley.

3. Tanenbaum A.S. and Herbert Bos (2014), Modern Operating Systems 4th Ed. Pearson Education.

4. McHoes, A. and Flynn, I. M (2014). Understanding Operating System, 7th Ed. Course Technology.

5. Md Shah, W., Anawar, S., and Zakaria, NA., (2016). Ubuntu: Guide for Basic Administration, Module 23, Penerbit Universiti, UTeM.

6. www.ubuntu.com

BITE 2123 Artificial intelligent for Games (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. A solid understanding of popular AI techniques that can help solve problems in artificial and real worlds.
2. A better understanding of how some of the complex behavior in today's interactive games is generated and managed.

Synopsis

In this course, various AI techniques for games including techniques for real-time heuristic search, managing NPC behaviour, crowd simulation, and resource balancing. AI techniques which are deployed in games including the A* path finding algorithm, rule based reasoning, neural networks, and genetic algorithms. The course will also be concerned with knowledge representation and problem formalization. To make the theory accessible and fun, the course will be using a game engine that allows students to apply AI routines that they choose and design.

References

1. Steve Rabin (2008) AI Game Programming Wisdom 4, Charles River Media.

2. Alex J. Champandard (2003) AI Game Development, New Riders Games.

3. Steve Rabin (2005) Introduction to Game Development, Charles River Media.

BITU 2913 Workshop I (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually.
2. Identify and solve problems in systematic way.
3. Defend while presenting result of the project.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. Workshop 1 is also functioned as the platform to prepare the students for their industrial training program.

References

1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2015.
2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son.
3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.
4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.
5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

BITU 3923 Workshop II (3, 0, 9)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

BITU 3926 Industrial Training (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Organise ICT tasks to fulfill an organisation's objectives.
2. Practise the knowledge and skills that they have learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.
4. Report technical tasks performed into a technical journal.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report (6, 0, 24)

Learning Outcomes

Upon completing this course, students should be able to:

1. Prepare an internship presentation.
2. Report on the knowledge and skills gained throughout their internship.

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3973 Final Year Project I (3, 0, 25)

Learning Outcomes

Upon completing this course, students should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review.
2. Develop project using an appropriate method.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II (3, 0, 25)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Verify the project based on the project timeline.
2. Complete the project output that has potential commercial value.
3. Defend the results to elaborate the significance of the project.
4. Organize information to produce a formal report.

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline 2015", FTMK, Universiti Teknikal Malaysia Melaka.

2. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Book", FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

COURSE CORE SUBJECTS

BITE 1613 2D Game Development (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Demonstrate the basic concept related to digital graphic design, computer graphics 2D and 2D computer game development. (C3)
2. Explain key skills, techniques and components in 2D computer games development. (A3, CTPS1)
3. Construct appropriate components for generating 2D computer games from different types and genres as the basis for continuous learning (P3, CS1, LL1)

Synopsis

This course provides students with the concept of digital graphic design, computer graphics 2D, and basic concepts and techniques for the development of a two-dimensional (2D) computer games. Students will be introduced to the concept of 2D raster graphics, and geometric 2D graphics. This course also covers the theory of computer games, game design, game logic and game engine development. In addition, students will also be exposed to other important matters related to the development of computer games such as the integration of 2D graphics and content development. At the end of this course, students will develop 2D games based on any given genres.

References

1. Steve Rabin (2010), Introduction to Game Development (Second Edition), Course Technology – Cengage Learning.
2. Jerry Lee Ford, Jr. (2010), Getting Started with Game, Course Technology Cengage Learning.
3. Gisele Umbhauer (2016), Game Theories and Exercise, Routledge – Taylors & Francis Group.
4. Jacob Habgood, Nana Neilsen & Martin Rijks (2012), The Game Maker Companion, Game Development: The Journey Continues, Technology in Action.
5. Peter Zackariasson & Timothy L. Wilson (2013), The Video Game Industry, Routledge – Taylors & Francis Group.

BITE 2633 Audio and Video Production in Games (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Apply the knowledge and principles of digital audio and video in computer games environment.
2. Demonstrate advanced skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Choose and organize audio video software and hardware in the conducive production environment with the latest and relevance information.

Synopsis

This course will give details and valuable insights of digital audio and video production in games industry. Throughout the semester, students will be introduced to relevant topics on digital audio and video hardware, the art of audio production, recording techniques, video production, the integration of other media in video product, implementing special effects, and storyboarding. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References

1. Mohd Hafiz Zakaria, Zulisman Maksom, Wan Sazli Nasaruddin Saifudin, and Mohd Haziq Lim Abdullah, in Press 2015. Digital Audio and Video Technology: Classroom in a book, Penerbit Universiti UTeM.

2. Marks, Aaron. 2009. The Complete Guide to Game Audio: for Composers, Musicians, Sound Designers, and Game Developers. Taylor & Francis: Oxford.

3. Ken C. Pohlmann, 2010. Principles of Digital Audio, Sixth Edition, McGraw-Hill Professional

4. Ananda Mitra, 2010. Digital Video: Moving Images and Computers, Facts on File Publishing

5. Adobe Creative Team, 2010. Adobe Premiere Pro CS5 Classroom in a Book, Adobe Press

BITE 2613 Interactive 3D Animation (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Understand the design and generation of a 3D environment for modeling, animation, and add interactivity.
2. Modeling, forging, animate, lighting and render 3D objects using a variety of software and equipment to produce animation work group.
3. Adopt the principles of environmental design 3D animation and interactivity in their interactive projects.

Synopsis

This course addresses the design and creation of 3D environments (such as using Maya) for modeling and animation and using tools (such as Virtools) for adding interactivity. Students are invited to explore the unique feeling of being immersed in a virtual world by creating new types of user experiences. Attention is given to the use of physical input devices or interaction regimes in the service of creating the user's feeling of delight in the artificial world.

References

1. Dariush Derakhshani, (2015) Autodesk 3ds Max 2016 Essentials, Sybex

2. Jere Miles, (2016) Unity 3D and PlayMaker Essentials: Game Development from Concept to Publishing (Focal Press Game Design Workshops), A K Peters/CRC Press

3. Micheal Lanham (2017) Augmented Reality Game Development, Packt Publishing

4. Michael O'Rourke, (2003) Principles of Three-Dimentional Computer Animation, W.W. Norton & Company

BITE 1513 Game Programming I (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Explain the key components of the programming language C + +.
2. Demonstrates the core principles of C + + programming.
3. Develop a simple game program using C + +.

Synopsis

The course is conducted to introduce the basic concepts of C + + programming includes variable declaration, loops and conditional repetition, arrays, pointers, functions and basic object-oriented programming. Basic object oriented programming involves classification of objects, polymorphism and inheritance. The course also exposes the concept of input-output and file manipulation some advanced topics such as C + + virtual functions, static overloading and operation. The purpose of this course is to provide basic knowledge of C + + so that students can display core competencies C + + and is able to produce a simple game using C + +.

References

1. Dawson, M. and Dawson, M. Beginning C++ Through Game Programming. Cengage Learning, 2006.

2. Malik, D. S. C++ Programming: From Problem Analysis to Program Design. Course Technology, 2008.

3. Horstmann, C. S. and Budd, T. A. Big C++, 2nd Edition. John Wiley, 2008.

4. Conger, D. Creating Games in C++: A Step-by-Step Guide. New Riders Games, 2007.

5. Thorn, A. Introduction to Game Programming with C++. Jones & Bartlett Publishers, 2007.

BITE 1523 Computer Game Programming II (3, 2, 2)

Learning Outcomes

1. Recognize different types of data structures and know their advantages and drawbacks.
2. Understand the impact of algorithms and data structures and how they affect performance.
3. Identify, use and application of data structures and algorithms that are appropriate in game programming.

Synopsis

This course involves the basic algorithms and data structures used in the latest software applications especially in game development. Particular emphasis is given to algorithms for sorting, searching and indexing. Data structure such as a list of links, binary trees, and graphs accumulation is also associated with the algorithm.

References

1. Ron Penton, “Data Structure For Game Programmers”, Game Development Series, The Premier Press, 2003. (EBook)

2. Eric S. Robert, “Programming Abstraction in C++”, Prentice Hall 1st edition, 2013. (EBook).

3. Allen Sherrod, “Data Structures and Algorithms for Game Developers”, Game Development Series, Charles River Media, Thomson Learning Inc., 2007. (EBook).

BITE 1713 Game Architecture (3, 2, 2)

Learning Outcomes

At the end of this course, students are able to:

1. Relate and explain the concepts, theories and Methods of computer game development programming
2. Describe the technical problems with the computer game development follow application development Lifecycle
3. Describe the current issues related to architectural design of computer games based on various sources of information relevant to the development of technology.

Synopsis

This course provides an introduction to the design aspects of the development of a game (games) computer. The topics cover the basic technical understanding, game design and programming. Other topics include game engine and type of games. Current issues related to games development Methods, technology and gaming trends are discussed at the end of the course.

References

1. F. von Borries, Steffen P. Walz, M. Bottger, D. Davidson, H. Kelley, J. Kucklick (2007), Space Time Play: Computer Games, architecture and urbanism: the next level, Springer.

2. A. Rolling, D. Morris. (2009), Game Architecture and Design, New Riders.

3. J. Gregory, J. Lander. (2009), Game Engine Architecture, A. K. Peters Ltd.

BITE 2513 Game Engine Development I (3, 2, 2)

Learning Outcomes

At the end of this course, students are able to:

1. Relate and explain the concepts, theories and Methods of computer game development programming.
2. Describe the technical problems with the computer game development follow application development lifecycle.
3. Describe the current issues related to architectural design of computer games based on various sources of information relevant to the development of technology

Synopsis

This course provides students with an introduction to the theory and practice of video game programming. Students will participate in individual hands-on lab exercises, and also work together like a real game development team to design and build their own functional game using an existing game engine (e.g. XNA). Concepts: Real-time programming and the game loop, human interface devices, 3D rendering, collision detection, skeletal animation, rigid body dynamics, game object models, event-driven programming, game scripting languages.

References

1. Jason Gregory (2013). Game Engine Architecture 2nd Edition. AK Peters.

2. Millington, I. (2010). Game Physics Engine Development: How to Build a Robust Commercial-Grade Physics Engine for your Game. Morgan Kaufmann

1. Thorn, A. (2010). Game Engine Design and Implementation. Jones & Bartlett Publishers.

2. Lengyel, E. (2011). Game Engine Gems 2. A K Peters/ CRC Press

3. Eberly, D. (2010). Game Physics. CRC Press

BITE 3713 Multi-platform Game (3, 2, 2)

Learning Outcomes

At the end of this course, students are able to:

1. Identify appropriate problem-solving techniques for the development of a multi-platform gaming computer.
2. Show the way and build a multi-platform computer game with reference to various information sources.
3. State and clarify issues related to technology and development trend of multi-platform computer game with reference to various information sources.

Synopsis

This course provides an introduction to the technical and design aspects in the development of multi-platform games. The topics cover the basic understanding of the technical, hardware, game design, programming and technology. Other topics include game type of game servers and platforms. Current issues related to gaming platforms, technology and multi-platform gaming trends are also discussed at the end of the course.

References

1. Thorn, A. (2008), Cross Platform Game Development: Make PC Games for Windows, Linux and Mac (Wordware Game Developer's Library), Jones & Bartlett Publishers

2. Alan Thorn. (2008), Cross Platform Game Development, Wordware Pub.

3. Alan Thorn. (2010), Game Engine Design and Implementation, Jones & Bartlett Learning.

4. Blackman, S. (2011). Beginning 3D Game Development with Unity All in one, multi platform game development. Apress.

5. Munro, J. (2012). 20 Recipes for Programming PhoneGap: Cross-Platform Mobile Development for Android and iPhone. O'Reilly Media

BITE 1723 Computer Game Design Principles (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Apply computer game design concepts and theories in the development of games.
2. Explain computer game design elements in various genres of games.
3. Follow game design principles in designing games using appropriate tools.

Synopsis

This course is designed to provide students with a fundamental working knowledge and understanding of critical concept and historical context for analyzing games, as well as the skills and techniques necessary to incorporate game design in their study. Students will learn how to identify, create and manipulate core game elements such as game philosophy, design process, player objectives, rule systems and the human elements in a game. This course will introduce students to the tools and concepts used to create levels for games. The course will incorporate level design and architecture theory, concepts of the critical path and flow, game balancing, playtesting and storytelling. Using user-friendly toolsets from industry titles, students will build and test levels that reflect design concepts.

References

1. Ernest Adams and Andrew Rollings, Fundamentals of Game Design, (2nd Edition), New Riders, 2009.
2. David Perry on Game Design : A Brainstorming Toolbox by David Perry, Rusel DeMaria (2009)
3. Game Development Essentials : An Introduction by Jeannie Novak (2007)
4. Game Development Essentials : Game interface Design by Kevin Saunders, Jeannie Novak (2007)

BITE 2523 Web Game Development (3, 2, 2)

Learning Outcomes

At the end of this course, students are able to:

1. Relate and explain the concepts, theories and Methods of on-line computer games development
2. Solve problems online game engine design by following Web game development programming techniques that meet industry specifications
3. Describe the issues related to the development of computer games Web from a variety of sources

Synopsis

This course provides an introduction to computer-based online games (online) or web games. The topics cover the basic technical understanding, design web game development game programming and safety (security). Other topics include online game engine and the type of web games. Current issues related to games development Methods; technology and gaming trends are discussed at the end of the course.

References

1. C. Griffith (2009), Real-world Flash Game Development: How to follow best practices and keep your sanity, Focal Press.
2. J. Makar. (2009), Action Script for Multiplayer Games and Virtual Worlds, New Riders.
3. W. McGugan. (2007), Beginning Game Development with Python and Pygame: from novice to professional, Springer.

BITE 3613 Game Project Management (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Prepare related documentations of games project management according to industry specification.
2. Demonstrate leadership skills, ethics and professionalism in managing group project.
3. Follow games project management techniques in analyzing project's risk, planning, cost management and control, quality assurance and budgeting.

Synopsis

This subject emphasizes on theory, application and practice in managing game projects. Students will gain knowledge and acquire skills in managing game projects such as planning, costing and preparing documentations. Students will demonstrate the key competencies required in managing game assets, resources and team members through group activities and case studies. They will be introduced to the roles as game producer, game artist, game designer, game developer and related supports in game production. At the end of the course, students must be able to adopt appropriate game project management tools in managing project activities. Students will be encouraged to actively participate and share their ideas through group discussions, presentations and role play.

References

1. Hight, H and Novak, J., Game Development Essentials: Game Project Management. Thomson Delmar Learning, 2008.
2. Vaughan, T., Multimedia: Making It Work 8th Edition. McGraw-Hill Osborne Media, 2011.
3. England, E. and Finney, A., Managing Interactive Media: Project Management for Web and Digital Media (4th Edition), Addison Wesley, 2007.
4. Frick, T., Managing Interactive Media Project. Thomson Delmar Learning, 2008.

BITE 2623 3D Game Development (3, 2, 2)

Learning Outcomes

Students completing this course are expected to be able to:

1. Describe & create content processing components, explain the components of the game loop, and the update & drawing phases in 3D game development.
2. Apply and analyze geometric transformations for continuing computer games development skills.
3. Build a simple 3D computer game from a specification in group.

Synopsis

This course addresses the processes, algorithms, and Mathematics necessary to create 3D computer games. It will also introduce students with fundamental computer graphics before introducing 3D graphics API such as OpenGL and Direct3D. The goal of this course is to develop the skills necessary for a professional programmer in a 3D game development team. Students will learn how to manage and render 3D images and animations and how to develop the interactive components that make computer games work.

References

1. OpenGL Superbible, 5th edition, by Richard Wright et al., Addison-Wesley, 2010.
2. Fundamentals of Computer Graphics, 3rd edition, by Peter Shirley et al., A.K. Peters, 2009.
3. Benstead, L., Beginning OpenGL Game Programming, Second Edition, Course Technology PTR, 2009.
4. Jones, W., Beginning DirectX 10 Game Programming, Course Technology PTR, 2007.
5. XNA 3.0 Game Programming Recipes: A Problem-Solution Approach, 2009, Riemer Grootjans, Apress, ISBN 978-1430218555

BITE 3513 Game Engine Development II (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Follow the latest game engine design approach and the concept of "game" and "play".
2. Analyzing the design principles of game design and production of experimental procedures using various software and tools.
3. Develop their own game engine design and implementation part of the engine and integrate third-party components in accordance with industry requirements specification.

Synopsis

This course provides students with an in-depth exploration of 3D game engine architecture. Students will learn stateof- the-art software architecture principles in the context of game engine design, investigate the subsystems typically found in a real production game engine, survey some engine architectures from actual shipping games, and explore how the differences between game genres can affect engine design. Students will participate in individual hands-on lab exercises, and also work together like a real game development team to design and build their own functional game engine by designing and implementing engine subsystems and integrating 3rd party components 3D game engine architecture

References

1. Jason Gregory. Game Engine Architecture. AK Peters. (2009) ISBN 978-1-56881-413-1.

2. Fullerton, G T. , Game Design Workshop, Second Edition: A Playcentric Approach to Creating Innovative Games", Morgan Kaufmann, 2008.

3. Schell, J. , The Art of Game Design: A Book of Lenses. Morgan Kaufmann, 2008

4. Juul, J. "A Casual Revolution: Reinventing Video Games and Their Players , The MIT Press, 2009.

ELECTIVE SUBJECTS

BITE 3523 Game Physics (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. Identify and manipulate Mathematical and physical concepts in computer game programming.
2. Describe the physical application of problem-solving computer game computer game development
3. Relate 3D graphics techniques in physics computer games to create realistic design ideas

Synopsis

This course discusses the techniques to create realistic 3D graphics environments using advanced computer game programming (C+ +). The emphasis is on the Mathematical and physical concepts in the development of computer games. The topics discussed consist of geometry, matrix, kinematics, and rotation violations and their application in the development of computer games.

References

1. Jason Gregory. Game Engine Architecture. (2009) AK Peters.

2. David H Eberly and Ken Shoemake (2006), Game Physics, Morgan Kaufman.

3. J. Van Verth, L.M. Bishop, (2008), Essential Mathematics for Games and Interactive Applications 2nd Edition.

BITE 3723 Game Mechanics (3, 2, 2)

Learning Outcomes

After completing this subject, students will be able to:

1. State and explain the core concept of the game mechanics.

2. Building a gaming applications by combining elements of text, graphics, audio, video and animation according to current needs.
3. Apply skills learned to solve problems by choosing some environments where game mechanics can be used in the presentation.

Synopsis

This course covers the game's graphics, physics, spund, input artificial intelligence, networking, and the level of identification. This course provides a broad foundation in the relevant field of computer games, serving as a primer and provides a context for specific courses in the last year. This course provides students with an introduction to the theory and practice of video game programming. Students will be involved in training sessions and laboratory work together as a team for the real game develops, design and build their own games using a function existing game engine (XNA example).

References

1. Adams, E. (2012). Game Mechanics: Advanced Game Design (Voices That Matter). New Riders.

2. Zichermann, G. (2013). The Gamification Revolution: How Leaders Leverage Game Mechanics to Crush the Competition. McGraw-Hill.

3. Dunniway, T. & Novak, J. (2008). Game Development Essentials: Gameplay Mechanics. Cengage Learning.

4. Zichermann, G. (2011). Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps. O'Reilly Media.

5. Hogos, M. (2013). Enterprise Games: Using Game Mechanics to Build a Better Business. CreateSpace Independent Publishing Platform.

BITE 3623 Motion Graphics (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Apply the knowledge and concepts of visual effects and motion graphics development.
2. Reproducing the visual effects for motion graphics using the appropriate application.
3. Selecting the appropriate approach from a variety of sources of information to apply visual effects and motion graphics in computer games.

Synopsis

This course introduces students to the basic of visual effects and motion graphics. This includes understanding and the design by using any visual effects and motion graphics application. Students will be provided with skills in using visual effects and motion graphics such as After Effects.

References

1. T. Meyer & C. Meyer, (2008), Creating Motion Graphics with After Effect, Focal Press.

2. C. Fahs & L. Weinman. (2007), Adobe After Effect 7 Hands-On Training, Peachpit Press.

3. M. Christiansen, (2009), Adobe After Effects CS4 Visual Effects and Compositing Studio Technique. Peachpit Press.

4. T. Meyer & C. Meyer, (2009), After Effects Apprentice, Focal Press

BITE 3633 Gameplay (3, 2, 2)

Learning Outcomes

At the end of this course, students are able to:

1. Demonstrate understanding and explaining theoretical concepts in problem solving computer games
2. Reproduce computer game design to apply basic design skills according to industry specifications (P3).
3. Clarify issues related to computer games based on various information sources.

Synopsis

This course provides an introduction to fundamental and basic aspects of the design and game design. The topics cover the basic understanding of the nature of the game, the type of players, and the rules of game design, and visual elements. Other topics include rewards & position in the game. Current issues related to the latest trends and game players and platform trends are also discussed at the end of the course.

References

1. G. Trefry (2010), Casual Game Design: Designing Play for the Gamer in ALL of US, Morgan Kaufmann.

2. K. Oxland. (2004), Gameplay and Design, Addinson-Wesley.

3. K. Salen, E. Zimmermen. (2004), Rule of Play: Game Design Fundimental, MIT Press

BITS 3423 Information Technology Security (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. Describe the concept, ethics and issues in internet technology security.
2. Identify the suitable components in providing security services and mechanism in computer software, operating system, database and network system.
3. Implement an appropriate security system mechanism.

Synopsis

Security in Information Technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this subject, student will be able to learn security services that covered Confidentiality, Integrity and
Availability (CIA) in ICT based system. This subject also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

1. Michael Goodrich, and Roberto Tamassia (2010), Introduction to Computer Security, Addison Wesley, ISBN 9780321512949.

2. W. Stallings (2010). Network Security Essentials: Applications and Standards, 4th edition, Prentice Hall, Inc, ISBN 978-0136108054.

3. D. Gollmann (2011). 3rd Edition, Computer Security, John Wiley & Sons, Inc, ISBN 978-0470741153

4. R. Bragg (2012). Certified Information systems Security Professional Training Guide, Que Certification, ISBN 0-7897-2801-x.

BITS 3333 Multimedia Network (3, 2, 2)

Learning Outcomes

Upon completing this subjects, students should be able to:

1. Compare various concepts of data representations, compression techniques, QoS mechanisms and applications in multimedia networking.
2. Justify the suitable technique to solve networking problems related to multimedia networks.
3. Manipulate the mechanisms that support the multimedia application in multimedia networking environment.

Synopsis

This topic covers the subject-topics basic and advanced network multimedia. Certain topics will be selected from multimedia information representation, compression, network High-speed such as Frame Relay, and ATM Network Local High-Speed Computers. The emphasis will also be given to the transmission protocol (TCP / IP, RSVP, MPLS, RTP) and Quality of Service (QoS) in networks such as Intergrated Services and Differentiate Services.

References

1. Jenq-Neng Hwang (2009), Multimedia Networking: From Theory to Practice. Cambridge University Press.

2. James F. Kurose and Keith W. Ross (2012), Computer Networking: A Top-Down Approach (6th Edition). Pearson Education

3. Santiago Alvarez (2012), QoS for IP/MPLS Networks, Cisco Press.

4. W. Stallings, (2002) High Speed Networks and Internets – Performance and Quality of Service. Prentice Hall

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

COURSE LEARNING OUTCOMES

The Diploma in Information and Communication Technology programme deals with designing innovative methodologies and sophisticated tools for developing software systems. Students are exposed to various techniques of analyzing user requirements and specifications, as well as design and implementation of software systems. Some of the core courses include object-oriented programming, database systems, software engineering and introduction to multimedia.

LEARNING OUTCOMES

i. Graduates should be able to understand fundamental principles of Computer Science and Information Technology.
ii. Graduates should be able to analyze, design and develop ICT software and database.
iii. Graduates should be able to configure hardware, maintain and administer computer operation systems and network.
iv. Graduates should be able to use multimedia authoring tools and develop multimedia application and simple multimedia presentation.
v. Graduates should be able to exhibit critical and creative thinking in resolving problems and able to communicate in delivering ideas.
vi. Graduates should be able to contribute individually or in a team in various discipline and domain.
vii. Graduates should have good personalities and ethics with leadership and Entrepreneurship skills.
viii. Graduates should be able to continue learning independently in the acquisition of new knowledge and skill.

CAREER PROSPECTS

Graduates of the program will be able to work as Programmers, Analyst Programmers, Multimedia Programmers, Network Administrators, Software Developers and any IT related positions. They may also pursue further education at degree level at UTeM.

CURRICULUM STRUCTURE

Student will be graduating with Diploma in Information and Communication Technology after successfully completing at least 91 credit hours. Credit hours for subjects are as follows:

Components	Credit Hours
University Compulsory Subjects	16
Program Core Subjects	27
Course Core Subjects	36
Elective subjects	12
TOTAL	91

UNIVERSITY COMPULSORY SUBJECTS (16 credits)

DLHW 1012	Foundation English
DLHW 2422	English for Effective Communication
DLHW 3432	English for Marketability
DLHW 1732	Malaysian Studies
DLHW 1722	Philosophy of Science & Technology
DLHW 1742	Leadership
DTMW 1012	Fundamentals of Entrepreneurial Acculturation
DXXX XXX1	Co-curriculum I
DXXX XXX1	Co-curriculum II

PROGRAMME CORE SUBJECTS (27 credits)

DITI 1213	Calculus
DITI 1223	Discrete Mathematics
DITI 2213	Linear Algebra and Numerical Methods
DITI 2223	Applied Statistics
DITP 1113	Programming I

DITU 3933	System Development Workshop
DITU 3964	Diploma Project
DITU 2343	Industrial Training
DITU 2362	Industrial Training Report

COURSE CORE SUBJECTS (36 credits)

DITP 1123	Programming II
DITP 1333	Database
DITP 2313	Database Programming
DITP 2113	Data Structures and Algorithm
DITP 2213	System Analysis and Design
DITP 3213	Software Engineering
DITS 1133	Computer Organization & Architecture
DITS 2213	Operating System
DITS 2313	Data Communication and Networking
DITS 2413	Computer Security
DITM 2113	Multimedia System
DITM 2123	Web Programming

COURSE ELECTIVE SUBJECTS (12 credits)

DITP 3253	Software Requirements and Design
DITP 3263	Software Verification and Validation
DITP 3273	Strategic Information System Planning
DITP 3313	Database Design
DITP 3323	Database Administration
DITM 3133	Digital Audio and Video Technology
DITM 3143	Digital Media Design
DITM 3313	User Interface Design
DITM 3323	Introduction to Computer Games Programming
DITS 3613	Basic Networking
DITS 3623	Network Routing
DITS 3633	Implementing and Administering Active Directory
DITS 3643	Implementing and Administering Network Infrastructure
DITI 3113	Artificial Intelligence
DITI 3123	Logic Programming
DITI 3513	Artificial Intelligence in Robotic and Automation

CURRICULUM STRUCTURE PER SEMESTER

Year One (Special Semester)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DLHW 1012	Foundation English	1	2	2	
DLHW 1032	Malaysian Studies	2	0	2	
DLHW 1722	Philosophy of Science and Technology	2	0	2	
Total				6	

Year One (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DXXX XXX1	Co-curriculum I **	0	3	1	
DITI 1213	Calculus	2	2	3	
DITP 1113	Programming I	2	2	3	
DITP 1333	Database	2	2	3	
DITS 1133	Computer Organization & Architecture	2	2	3	
DITM 2113	Multimedia System	2	2	3	
Total				16	

**This subject can be taken in any semester. Please refer to co-curriculum unit before registered.

Year One (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DLHW 2422	English for Effective Communication	2	0	2	
DITI 1223	Discrete Mathematics	2	2	3	
DITP 2113	Data Structure and Algorithm	2	2	3	DITP 1113
DITP 1123	Programming II	2	2	3	DITP 1113
DITS 2213	Operating System	2	2	3	DITS 1133
DITM 2123	Web Programming	2	2	3	
Total				17	

Year Two (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DTMW 1012	Fundamentals of Entrepreneurial Acculturation	1	2	2	
DLHW 1742	Leadership	2	0	2	
DXXX XXX1	Co-curriculum II **	0	3	1	
DITI 2213	Linear Algebra and Numerical Methods	2	2	3	
DITP 2213	System Analysis and Design	2	2	3	DITP 1333
DITP 2313	Database Programming	2	2	3	DITP 1333
DITS 2313	Data Communication and Networking	2	2	3	
Total				17	

Year Two (Semester II)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DLHW 3432	English for Marketability	2	0	2	
DITI 2223	Applied Statistics	2	2	3	
DITU 3933	System Development Workshop	0	9	3	DITP2213
DITP 3213	Software Engineering	2	2	3	DITP 2213
DIT ----	Elective 1	2	2	3	
DIT ----	Elective 2	2	2	3	
Total				17	

Year Two (Special Semester)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DITU 2343	Industrial Training	0	20	3	
DITU 2362	Industrial Training Report	0	2.5	2	
Total				5	

Year Three (Semester I)

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DITU 3964	Diploma Project	0	9	4	DITU 3933
DITS 2413	Computer Security	2	2	3	DITS 2213
DIT ----	Elective 3	2	2	3	
DIT ----	Elective 4	2	2	3	
Total				13	

Elective

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DITP 3253	Software Requirements and Design	2	2	3	
DITP 3263	Software Validation and Verification	2	2	3	DITP 3213
DITP 3273	Strategic Information System Planning	2	2	3	
DITP 3313	Database Design	2	2	3	DITP 1333
DITP 3323	Database Administration	2	2	3	DITP 1333
DITM 3133	Digital Audio and Video Technology	2	2	3	
DITM 3143	Media Digital Design	2	2	3	
DITM 3313	User Interface Design	2	2	3	
DITM 3323	Introduction to Computer Game Programming	2	2	3	
DITS 3613	Basic Networking	2	2	3	DITS 2313
DITS 3623	Network Routing	2	2	3	DITS 3613
DITS 3633	Implementing and Administering Active Directory	2	2	3	DITS 2213
DITS 3643	Implementing and Administering Network Infrastructure	2	2	3	DITS 3633
DITI 3113	Artificial Intelligence	2	2	3	
DITI 3123	Logic Programming	2	2	3	
DITI 3513	Artificial Intelligence in Robotics and Automation	2	2	3	

List of elective subjects offered will be modified from time to time in accordance with industry needs.

Third Language

Code	Subject	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DLHL 1012	Malay I	2	1	2	
DLHL 1022	Malay II	2	1	2	DLHL 1012
DLHL 1112	Arabic I	2	1	2	
DLHL 1122	Arabic II	2	1	2	DLHL 1112
DLHL 1212	Mandarin I	2	1	2	
DLHL 1222	Mandarin II	2	1	2	DLHL 1212
DLHL 1312	Japanese I	2	1	2	
DLHL 1322	Japanese II	2	1	2	DLHL 1312

** Students are encouraged to take ONE third language subjects in any semester during the study.

PROGRAMME CORE SUBJECTS

DITI 1213 Calculus (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply knowledge and fundamental concepts of Calculus (C3,CS2)
2. Manipulate problems using software by referring to Calculus theories (CTPS2,P3)
3. Solve application problems by relevant information using suitable techniques. (CS2, CTPS2, C3)

Synopsis

This course covers one discipline of mathematics namely Calculus. Topics for Calculus include Set of Real Numbers, Functions, Derivative, Techniques of Differentiation, Application of Derivatives, Exponential and Natural Logarithm Functions, Definite Integral, Techniques of Integration, Application of Integration and Functions of Several Variables.

References

1. Bittinger M.L.,Ellenbogen D.J, S.J. Surgent (2012).
2. Calculus and Its Applications, Pearson International Edition.
3. Goldstein, L. J., Lay, D.C, Schneider D.I., Asmar, N.H. (2013). Brief Calculus and Its Applications, 13th Edition; Pearson.
4. Briggs, B., Cochran, L., Gillett, B. (2014). Calculus: Early Transcendentals. Pearson.
5. Stewart, J.(2015). Calculus, 8th Edition; Pearson Education.
6. Larson (2012). Brief Calculus: An Applied Approach, 9th Edition; Cengage Learning.

DITI 1223 Discrete Mathematics (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the basic concepts and techniques of Discrete Mathematics (C2)
2. Apply those concepts and techniques to related theoretical problems (C3, P3, CTPS3)
3. Propose solutions to problems in applied computer science with the assistance of an appropriate use of software (A3, LL2)

Synopsis

This course introduces the fundamental concepts and techniques of Discrete Mathematics that are needed for computer science. It includes logics, sets, functions, counting, relations, graphs and trees along with their applications to problems in computer science.

References

1. Rosen, K., **Krithivasan, K.,** (2013), "Discrete Mathematics and Its Applications Global Edition 7th Edition", McGraw-Hill.
2. Stein, C. L., Drysdale, R., and Bogart, K., (2010), "Discrete Mathematics for Computer Scientists 1st Edition", Addison-Wesley.
3. Haggarty, R., (2002), "Discrete mathematics for computing 1st Edition", Addison-Wesley.
4. Epp, S. S., (2011), "Discrete mathematics with applications 4th Edition", Brooks Cole, Cengage Learning.
5. Grimaldi, R.P. (2004). Discrete and Combinatorial Mathematics: An Applied Introduction. Fifth Edition. Pearson Education. Inc.

DITI 2213 Linear Algebra and Numerical Methods (3, 2, 2)

Learning Outcomes

Upon the completion of this subject, the students will be able to:

1. Solve problems on the basic concepts of Linear Algebra and Numerical Methods (C3).
2. Replicate steps of solving Linear Algebra and Numerical Methods problems using an appropriate tool or software (P3, CTPS2).
3. Propose solutions to related problems by recognising relevant information and using suitable concepts and/or principles in Linear Algebra and Numerical Methods (A3).

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Numerical Methods. Topics for Linear Algebra include Matrices, Determinant, Inverse, Linear Equations Systems, Vector Spaces, Eigenvalues & Eigenvectors and Linear Transformations. Numerical Methods topics consist of Taylor Polynomials, Error and Computer Arithmetic, Root finding, Interpolation, Numerical Differentiation, Numerical Integration, and Numerical Solution to Ordinary Differential Equation

References

1. Kolman, B. & Hill, D.R. (2014), Introductory Linear Algebra with Application, 9th Edition. Prentice Hall.
2. Anton, H. & Rorres, C. (2015), Elementary Linear Algebra with Supplemental Applications, 11th Edition, John Wiley & Sons.
3. Atkinson, K. & Han, W. (2004), Elementary Numerical Analysis, 3rd Edition. John Wiley & Sons, Inc.
4. Burden, R.L., Faires, J.D. & Burden, N.M. (2016), Numerical Analysis, 10E Edition. Cengage.

DITI 2223 Applied Statistics (3, 2, 2)

Learning Outcomes

After attending this course, the student will be able to:

1. Explain the fundamental concepts of statistics and its application. (A3, CTPS1)
2. Apply concept of probability and inferential statistics techniques to solve application problems. (C3, CTPS2)
3. Manipulate solutions of application problems using statistical software. (P3, LL1)

Synopsis

Students are exposed to the concept of probability and inferential statistics. The course starts with data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distributions. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing and simple linear regression. Besides that, this course will give some exposure to statistical software.

References

1. Mann, P. S., (2013), “Introductory Statistics”, 8th Edition, Wiley
2. Navidi, W., (2014), “Statistics for Engineers and Scientists”, 4th Edition,McGraw-Hill Education.
3. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), “Probability and Statistics for Engineers & Scientist”, 9th Edition, Pearson Educational International.
4. Sharifah Sara, Hanissah, Fauziah, Nortazi, Farah Shahnaz, Introduction to Statistics and Probability: A Study Guide, Prentice Hall, 2008.
5. David M. Levine, Patricia P. Ramsey, Robert K. Smidt, Applied Statistics for Engineers and Scientists Using Microsoft Excel and Minitab, Prentice Hall, 2001.

6. Devore, J. L., (2015), Probability and Statistics for Engineering and the Sciences, 9th Edition, Cengage Learning.

DITP 1113 Programming I (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications (C2, CTPS1)
2. Construct computer program codes by applying suitable programming tools, structures and techniques. (C3 ,A2)
3. Apply suitable programming structures and techniques in problem solving. (P3, LL1, CS1)

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.

2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.

3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.

4. Liang, Y. D. (2010), "Introduction to Programming with C++ 2 nd Edition", Pearson Education International.

5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

DITU 3933 System Development Workshop (3, 2, 2)

Learning Outcomes

Upon completing this course, students will be able to:

1. Identify the problems in information system development (C4, TS1).
2. Recognize the appropriate methodical support for information system development. (C4, CTPS2, LL1, ES1).
3. Apply the appropriate information system development methods and tools in a project assigned to a group (C3,P4,CTPS1,TS1)
4. Present the given project outcome and produce a report whichdetails all stages of the project development (C3, A3, CS2, TS1, EM1).

Synopsis

This course will require students to design, construct and assess an information system to solve a specific information system problems. Students should be working with a group of four and encouraged to select a problem to solve in which they are interested and which is achievable by their lecturer. Students should present the work at the end of the semester and produce a report of the given project. The expected outcome is a working information system, a written report detailing the work undertaken and assessment of the success of the work in solving the initial problem.

References

1. Shelly, G., Cashman, T. & Rosenblatt, H. 2012. Systems Analysis and Design, Shelly Cashman Series.

2. Valacich, J. S., George, J. F. & Hoffer, J.A. 2014. Modern Systems Analysis and Design, 6th edition, Pearson.

3. Dennis, A., Wixom, B. H. & Roberta, M. R. 2012. Systems Analysis Design, 5th Edition, Wiley.

4. Kendall, K. E. & Kendall, J. E. 2013. System Analysis and Design. 9th Edition. Pearson Education

5. Coronel, Morris & Rob (2012) Database Principles: Fundamentals of Design, Implementation and Management 10th Edition. Cengage Learning.

6. Connolly, T., Begg, C. & Strachan, A. (2010) Database Systems: A Practical Approach to Design, Implementation, and Management. 5th Edition.Addison-Wesley.

DITU 3964 Diploma Project (4, 0, 9)

Learning Outcomes

Upon completion of this course, students will be able to:

1. Identify problems related to industrial needs in the ICT domain. (C1, CTPS2, LL3)
2. Construct system applications using relevant project management methods. (C3, CTPS3)
3. Organize information to produce a formal report. (P4, EM2)
4. Present a completed project. (A2, CS3)

Synopsis

Diploma project trains the students to practice their knowledge by undertaking a project. The students are exposed to real system development environment in which they will have to analyze and solve system related problems, plan and develop the system as well as to meet the design and analysis requirements using appropriate computer programming language.

References

1. Bachelor Final Year Project and Diploma Project Committee, "Diploma Project Handbook", 5th Edition (2014), FTMK, Universiti Teknikal Malaysia Melaka.

DITU 2363 Industrial Training (3, 0, 15)

Learning Outcomes

By the end of this subject, students should be able to:

1. Show the knowledge and skills that they've learned in classes throughout their internship (C3, P2, TS1).
2. Demonstrate an internship presentation (A3, CS3),
3. Describe a report and a log book based on the knowledge and skills gained throughout their internship (C2).

Synopsis

Students must do the internship no less than 10 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student only once and usually it will be near the end of the 10 week period. During the visit, students are required to do a presentation at the organization in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM, 2013.

DITU 2362 Industrial Training Report (3, 0, 15)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Write a report based on the knowledge and skills gained throughout their internship.

Synopsis

This subject is an extension of DITU 2343 where students must do the internship no less than 10 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student only once and usually it will be near the end of the 10 week period. During the visit, students are required to do a presentation at the organization in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM, 2009.

COURSE CORE SUBJECTS

DITP 1123 Programming II (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications (C2, CTPS1)
2. Construct computer program codes by applying suitable programming tools, structures and techniques. (C3, A2)
3. Apply suitable programming structures and techniques in problem solving. (P3, LL1, CS1)

Synopsis

This course covers the introductory topics in programming using C++ language. It includes problem solving using array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.
2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.
3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5 th Edition", Cengage Learning.
4. Liang, Y. D. (2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.
5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

DITP 1333 Database (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Illustrate Entity Relationship Diagram (ERD) based on database and data modeling concepts (C2,P3)
2. Construct simple and complex SQL queries (C3, A3)
3. Apply suitable data modeling concepts and SQL in problem solving (CTPS2, CS1)

Synopsis

This is an introductory course to database and file management system. It assists students to form an understanding to data modeling, file management and database system functionality in information system. The students will be introduced to the process of designing, developing and executing database applications. This course focuses on practical skills to create, control and execute SQL statement.

References

1. Connolly, T. & Begg, C. (2014) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition. Addison-Wesley.
2. Coronel, Morris & Rob (2013) Database Principles: Fundamentals of Design, Implementation and Management. Cengage Learning.
3. Elmasri, Ramez, Navathe, S.B. (2010) Fundamentals of Database Systems. 6th Edition. Addison-Wesley.
4. Hoffer, Jeffrey A ., Prescott, Mary B. & McFadden, Fred R. (2009) Modern Database Management 9th Edition. Prentice Hall
5. Mannino, M.V. (2008) Database Application Development & Design. 4th Edition. McGraw-Hill.

DITP 2313 Database Programming (3, 2, 2)

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain features, syntax, purpose and benefits of SQL and PL/SQL to developer and database administrator. (C2, A3)
2. Apply control structures, records and cursors in PL/SQL blocks. (C3, CTPS2)
3. Construct procedures, functions, packages and database triggers, and manipulate large object sizes. (C3, P3)

Synopsis

The contents of this course are based on the syllabus of two modules in Oracle certification (Oracle Certified Associate). The first part of the lesson introduces the concepts of relational database and SQL syntax. This includes topics related to Oracle database architecture, its ability, constraints in data integrity, and other database objects such as views, index, sequence and synonyms. The second part of the lesson explains the objectives, functions and benefits of PL/SQL in developing database applications. This includes the development, implementation and maintenance of procedures, functions, packages and database triggers. The lesson also explains the use of stored procedures and triggers in retrieving data and executing complex business rules to enhance data integrity. Students will be introduced to Oracle packages, subprograms and PL/SQL triggers.

References

1. Pataballa, N. and Nathan, P. (2001). Introduction to Oracle9i: SQL, Volume 1 and Volume 2, Oracle University.
2. Pataballa, N. and Nathan, P. (2001). Oracle9i: Program with PL/SQL, Volume 1 and Volume 2, Oracle University.
3. Feuerstein, S and Pribyl, B. (2014), Oracle PL/SQL Programming, 6th Edition, O'Reilly Media.
4. Morris-Murphy, L. L. (2003), Oracle 9i: SQL with Introduction to PL/SQL, Course Technology.
5. Urman, S. (2002), PL/SQL Programming, Berkeley, CA. Osborne McGraw-Hill, Oracle Press.

DITP 2113 Data Structure and Algorithm [3, 2, 2]

Learning Outcomes

Upon completing this course, students will be able to:

1. Describe the usage of various data structures. (C2, A2)
2. Recognize the associated algorithm's operations and complexity. (C3, CTPS1)
3. Apply appropriate data structures for solving computing problems. (P3,CS1)

Synopsis

This course is to develop students' knowledge of data structures and algorithms. The course begins with the introduction of

concepts and techniques of structuring and operating on Abstract Data Types in problem solving. Followed with the discussion of the operations of maintaining common data structures. Students' are exposed on how to recognize the associated algorithms' operations and complexity. Common sorting, searching and graph algorithms will be discussed and the complexity and comparisons among these various techniques will be studied.

References

1. Michael T. Goodrich, Roberto Tamassia & David M. Mount, *"Data Structures and Algorithms in C++"*, Wiley, John & Sons, Inc., 2011.
2. Drozdek, A., "*Data Structures and Algorithms in C++ 4th Edition*", Course Technology, Cengage Learning, 2013.
3. Malik, D. S.*, "Data Structures Using C++ 2nd Edition".* Course Technology, Cengage Learning, 2010.
4. Malik, D. S.*, "C++ Programming: Program Design Including Data Structures" , 7th Edition"*, Course Technology, Cengage Learning, 2015

DITP 2213 System Analysis and Design (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the information systems and system development methodology (C2, P2, A2)
2. Use several tools and techniques to plan, analyze and design a new system (C2, P3, A2)
3. Apply the waterfall methodology to develop a system (C3, P3, A3)

Synopsis

In this course, students will be introduced to a variety of information systems. Then, this course explains the development methodology especially the Waterfall and RAD. After that, it discusses the planning phase with a focus on project management and project identification. The analysis phase will emphasize on the determination of user requirements, DFD and ERD in structuring user's needs. The design phase then discusses form design and report, database, and interface design. Final phase of system development will cover the coding, testing and system maintenance.

References

1. Hoffer, Jeffrey A., George, Joey F., Valacich, Joseph S., (2011) Modern System Analysis & Design, 6th Edition, Prentice Hall.
2. Kendall, Kenneth E., Kendall,. J., (2011) System Analysis and Design, 8th Edition, Prentice Hall
3. Whitten, J., Bentley L., Dittman, K., (2007) Systems Analysis and Design for Global Enterprise, 7th Edition, McGraw-Hill
4. Dennis, A., Barbara, H. W., (2003) System Analysis & Design, 2nd Edition, John Wiley & Sons, Inc

DITP 3213 Software Engineering (3, 2, 2)

Learning Outcomes

At the end of this course, students colud:

1. Describe the concept of software engineering for system development. (C1, P1, A1, CTPS1).
2. Explain concepts of Software Process and Model in the system development (C2, P2, A3, CTPS2).
3. Prepare formal specifications and software modeling in a collaborative team environment for the purpose of system development. (C3, P2, A2, TS1).

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject

exposes the student to structured approach and object oriented approach using UML.

References

1. Pfleeger, S.L, Atlee, J.M., *Software Engineering Theory and Practice*, 4th *Edition* 2010, Pearson.
2. Sommerville, I., *Software Engineering*, 9th International Edition. 2011, Addison-Wesley.
3. Pressman, R.S., *Software Engineering: A Practitioner's Approach, 7th International edition* 2010, McGraw-Hill.
4. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, *System Analysis Design with UML, 5th Edition*, Wiley.

DITS 1133 Computer Organization & Architecture (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the principles and techniques used in implementing a computer architecture and organization concept (C2, CS3).
2. Differentiate the concept of functional computer components and the detail interactions in computer systems (C2, CTPS3).
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory (P2).

Synopsis

This subject provides a detail of computer system's functional components, their characteristics, their performance and their interactions including system bus, different types of memory and Input/Output and CPU, as well as practical implementations of the components. Besides, the architectural issues, such as instruction set design and data types, are covered. In addition to this, students are introduced to the increasingly important area of parallel organization.

References

1. William Stallings, (2015). Computer Organization & Architecture, 10th Edition. Prentice Hall.
2. Linda Null and Julia Lobur (2014). The Essential of Computer Organization and Architecture, 4nd Edition. Jones & Bartletts Pub.
3. Syarulnaziah, Zakiah, Marliza, Aslinda. *Lab Module: Computer Organization and Architecture With MIPS Programming*.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, (2011). Computer Organization, 6th Ed. McGraw Hill.
5. Irv Englander, (2014). The Architecture of Computer Hardware and System Software: An Information Technology Approach. 5rd Edition. John Wiley & Sons.
6. David A. Patterson and John L. Hennessy (2013). Computer Organization and Design: The Hardware / Software Interface, 5rd Edition. Morgan Kauffman.

DITS 2213 Operating System (3,2,2)

Learning Outcomes

By the end of this subject, the student should be able to:

1. Describe the major components and functionalities of operating system and the underlying structure. (C2)
2. Justify different types of operating system algorithms such as I/O scheduling, memory scheduling and uniprocessor scheduling. (C2, CTPS3)
3. Demonstrate basic system administration task in different operating system. (P2)

Synopsis

This course is designed to give an exposure to students about the fundamental of operating system including process, management of memory, file and I/O and also about CPU scheduling. The introduction part consists of the evolution of

operating system since it started until now. Student will also learn about the basic concepts, technology and theory used in operating system such as concurrency, kernel, dead lock and multithreading. In addition, students will be introduced to few types of operating systems at basic administrative level.

References

1. Stallings, W. (2015), Operating Systems: Internals and Design Principles 8th Ed., Prentice Hall International, Inc.

2. Anderson, T. and Dahlin, M. (2014), Operating Systems: Principles and Practice 2nd Edition, Recursive Books.

3. Tanenbaum, A.S. (2014). Modern Operating Systems. 4th Ed., Prentice Hall International, Inc.

4. McHoes, A. and Flynn, I. M (2013). Understanding Operating System, 6th Ed. Course Technology.

5. Silberschatz, A, Galvin, P.B. and Gagne, G. (2011). Operating System Concept 8th.Ed. John Wiley and Sons, Inc.

6. Jason W. Eckert, M. John Schitka. Linux Guide to Certification.

DITS 2313 Data Communication and Networking (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to perform tasks related to the following:

1. Understands the knowledge of data communication fundamental and networking concepts (C2)
2. Differentiate types of media, network topology, network technologies and signal data transmissions. (A2, CTPS2)
3. Demonstrate skills to configuring and troubleshooting basic wired and wireless network (P3, CTPS2)

Synopsis

This course introduces the fundamental concepts and terminologies of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of communications, process of data signals transmission, network media, IP addressing and managing the network.

References

1. Forouzan, Behrouz A., 2012. *Data Communications and Networking*, 5thEdition, McGraw-Hill.

2. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, Business Data Communications and Networking, 12th Edition, Pearson

3. ZurinaSaaya, MarlizaRamly, Nazrulazhar Bahaman, Muhammad SyahrulAzhar Sani, NorharyatiHarum, HanizaNahar and Othman Mohd, 2014. Lab Companion: Data Communications and Networking, 1st Edition.

4. Randall J. Boyle, Jeffrey A. Clements, 2013. Applied Networking Labs, 2nd Edition, Prentice Hall

5. Curt M. White, 2012. Data Communications and Computer Networks, Cengage Learning

DITS 2413 Computer Security (3, 2, 2)

Learning Outcomes

At the end of this course, students will be able to:

1. Provides foundation knowledge for further advanced study of security issues in computer systems and legal or ethical issues knowledge.
2. Manage to configure a workstation to monitor the system's performance.
3. Manage hard disks, data storage and disaster recovery and device drivers with device drivers signing and driver restoring.

Synopsis

This subject provides students with the knowledge and skills that are needed to effectively maintain Workstation resources, monitor Workstation performance, and safeguard data on a computer running one of the operating systems in the Microsoft® Windows.

References

1. Maintaining Microsoft Windows 2003 Server Environment, Microsoft Training and Certification, Microsoft Corporation, April 2003, X09- 61770.

2. Security+ Guide To Network Security Fundamentals , by Paul Campbell, ben Calvert and Steven Boswell, Thomson Course Technology, Canada, 2003, ISBN 0- 619 - 12017 -7.

3. Security in Computing, 3rd Edition, Charles P.Pfleeger and Shari Lawrence Pfleeger, Prentice Hall, New Jersey, 2003, ISBN 0- 13 -035548-8.

4. Lab Manual for Security+ - Guide to Network Security Fundamentals, Paul Cretaro, Thomson Course Technology, Canada, 2005, ISBN 0-619- 21536-4.

5. Fire in the Computer Room, What Now? Disaster Recovery: Planning for Business Survival, Gregor Neaga, Bruce Winters and Pat Laufman, Prentice Hall, New Jersey, 1997, ISBN 0-13-754391-3

6. Security Planning and Disaster Recovery, Eric Maiwald and William Sieglein, McGraw Hill, 2003, ISBN 0-07 - 222463 - 0.

7. Information Security: Principles and Practices, Mark Merkow and Jim Breithaupt, Pearson Prentice Hall, New Jersey, 2006, ISBN 0-13- 154729-1

DITM 2113 Multimedia System (3, 2, 2)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Explain the core concept of multimedia systems. (C2)
2. Prepare multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs. (C3, P3, LL)
3. Apply problem solving skills in planning and developing multimedia project. (A3, CTPS)

Synopsis

This course is conducted to give an exposure to students with regards to core concepts of multimedia, technology and the importance of multimedia applications. The topics which the students will learn include introduction to media, implementation of multimedia graphics, graphics and 2D/3D animation, video, audio, multimedia authoring, multimedia integration and application development. Lab sessions will introduce students to a variety of media softwares for the integration of medias. Students will also be exposed to practical sessions of media preparation like image editing, animation and audio production, short video and to apply it effectively in a multimedia project done in groups. At the end of the semester, each group is required to present their projects in a formal session.

References

1. Norasiken et. al (2014), Multimedia System, Penerbit Universiti UTeM.

2. Norasiken Bakar & Faaizah Shahbodin (2012), Adobe Flash Professional CS5, Penerbit Universiti UTeM.

3. Norasiken Bakar & Siti Nurul Mahfuzah (2013), Adobe Photoshop CS5, Penerbit Universiti UTeM.

4. Vaughan, T., (2008), Multimedia: Making It Work 7th Edition, McGraw-Hill Osborne Media.

5. Norazlin et al. (2007), Sistem Multimedia, Venton Publishing.

DITM 2123 Web Programming (3, 2, 2)

Learning Outcomes

Upon completion of this course the student will able to:

1. Explain the concept and the principle of Internet and WWW based on the latest technologies. (A2, LL)
2. Use the important components in web applications which are Client Site Technology, Server Site Technology, Database Server and Web Server. (C3,CTPS)
3. Demonstrate the appropriate use of important components in developing web applications. (C3,P3)

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are

- Client Site Technologies: HTML, XHTML, HTML5, CSS, XML, and JavaScript
- Server Site Technologies: PHP
- Database Server: MySQL.
- Web Servers : Apache

This course also brings together all of the elements of Web site design, graphics, animation, data storage in the construction of fully functional commercial Web site applications.

References

1. Robert W.Sebesta (2014), Programming The World Wide Web– 8th Edition, Pearson, ISBN: 0133775984

2. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web - How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.

3. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 Learning Php, Mysql, Javascript, Css & Html5) 4th Edition, O'Reilly. ISBN: 1491918667.

4. Jennifer Niederst Robbins (2012), Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics 4th Edition, O'Reilly. ISBN: 1449319270

ELECTIVE SUBJECTS

DITP 3253 Software Requirements and Design

Learning Outcomes

Upon completing the course the student will be able to:

1. Analyze software requirement and design the software using object oriented approach and UML (C2, A2, LL, CTPS).

2. Model software analysis, software requirement and software design using object oriented approach supported by case tool, StarUML (C2, P2, A2, LL, CS, CTPS, TS).
3. Write formal software specification document and software design document (C3, P3, A3, CTPS).

Synopsis

This course introduces the student to the object oriented approach using UML such as object-oriented concept, object oriented application development life cycle, UML history and notation, comparison between OOAD and SDM and introduction to object and class. The topics includes the use-case, use case diagram and use case description. Student will learn to identify the uses cases, actors, perform analysis modeling sing dynamic or static diagram such as activity diagram, sequence diagram, collaboration diagram and class diagram.

References

1. Ian Sommerville, Software Engineering 10th Edition, Addison Wesley 2016

2. Martin Fowler, UML Distilled Third Edition A Brief Guide to the Standard Object Modeling Language, Addison Wesley 2003

3. Cay Horstman, Object Oriented Design and Patterns, John Wiley and Sons 2006

4. Alan Shalloway, James Trott Design Patterns Explained: A New Perspective on Object-Oriented Design, 2/E, Addison-Wesley Professional, 2005

5. Jim Arlow, Ila Neustadt UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2/E, Addison-Wesley Professional, 2005

DITP 3263 Software Validation and Verification (3, 2, 2)

Learning Outcomes

Upon completing this subject, students should be able to:

1. Understand and choose suitable Methods used in testing and quality assurance
2. Develop software testing and quality activity in real software projects.
3. Manage testing phase to assure software quality by using techniques and tools that full fill current requirement

Synopsis

This course gives exposure to the students about the software testing concept and focus on process to develop and implement testing plan, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activity such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation.

References

1. Muller, Thomas et. al., (2007) ISTQB Certified Tester: Foundation Course in Software Testing. International Software Testing Qualification Board.

2. Galin, D. (2004). Software Quality Assurance, From Theory to Implementation. Pearson Addison-Wesley.

3. John Watkins. (2001). Testing IT – An Off-the-Shelf Software Testing Process. Cambridge University Press.

4. Glenford J. Myers. (2004). The Art of Software Testing. Second Edition. John Wiley & Sons.

5. Khan, RA., Mustafa K., Ahson, SI., (2006). Software Quality: Concepts and Practices. Alpha Science.

DITP 3273 Strategic Information System Planning (3,2,2)

Learning Outcomes

Upon completing this subject, the students should be able to:

1. Explain the business organization components, environment, challenges and objectives of information systems (IS) investment.
2. Discuss the IS and strategic planning tools used in planning process
3. Propose information systems strategically appropriate for small enterprise

Synopsis

This subject will introduce the importance of information systems (IS) to enhance organisation competitiveness. Therefore the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitive than other organisations. Then students will work to integrate organisation's business objectives with IS that support its business direction and creating competitive advantage to the organisation.

References

1. Laudon, Kenneth C. & Laudon, Jane P.2007. Essentials of Business Information Systems, 7th Edition, Pearson.

2. Laudon, Kenneth C. & Laudon, Jane P.2010. Management Information Systems: Managing The Digital Firm, 11th Edition, Pearson.

3. Robson, Wendy. 1997. Strategic Management & Information Systems, 2nd Edition, Prentice Hall.

4. Ward, John & Peppard, Joe.2002. Strategic Planning for Information Systems, 3rd Edition, John Wiley & Sons.

DITP 3313 Database Design (3, 2, 2)

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Describe the characteristics of advanced database systems. (C1, P1, A1)
2. Construct data model using relational and non-relational data modeling techniques. (C3, P3, A2)
3. Explain database design issues in specialized applications such as dss and e-commerce. (C2, P2, A3)
4. Apply the best approach in building a database system that meets the functional requirements with the required quality of service. (C3, A3)

Synopsis

Fundamental principles and design issues related to non-relational data models like object-oriented and object-relational data model together with the enhanced features of ERD. Advanced database concepts and applications such as data warehouse, OLAP, data mining, database in electronic commerce and distributed databases systems.

References

1. Coronel, C., Morris, S. and Rob, P. (2013) *Database Systems: Design, Implementation and Management*, 10th Edition, Course Technology.

2. Connolly, T. and Begg, C. (2010) *Database Systems : A practical approach to design, implementation and management*, 5th Edition, Pearson Education.

3. Elmasri, R and Navathe, S. (2011) *Fundamentals of Database Systems*, 6th Edition, Addison-Wesley.

4. Silberschatz, A., Korth, H. F. and Sudarshan, S. (2010)*Database System Concepts*, 6thEdition, McGraw-Hill.

5. Nurul, A.E (2006) *Beginning database design: A Practical Approach for non-relational database*, PenerbitUniversiti, KUTKM.

DITP 3323 Database Administration (3, 2, 2)

Learning Outcomes

By the end of this subject, the student should be able to:

1. Explain the concept of database administration system. (A1, C2, P1, CS1)
2. Describe the roles and responsibilities of a database administrator. (A2,C2,P2,CTPS3)
3. Explore the functions, architectures and performance of database management systems. (A3, C3, P3, TS1)

Synopsis

This subject focuses on the roles, issues and responsibilities of database administrators, functions of the DBMS such as storage, access and data updates; database objects; indexes and data integrity; planning and implementation of performance activities, upgrading and user management.

References

1. Mullins, C.S. (2012) Database Administration: The Complete Guide to DBA Practices and Procedures, 2E. Addison-Wesley.

2. Bryla, B. & Loney, K. (2008) Oracle Database 11g DBA Handbook. Oracle Press.

3. Matishak, D. & Fuller, M. (2009) Oracle Database 11g: Administration Workshop I. Oracel Corp.

4. Fogel, S. et. . al (2015) Oracle Database Administrator's. Oracle Corp.

DITM 3133 Digital Audio and Video Technology (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain and apply the knowledge and principles of digital audio and video. (C3)
2. Demonstrate advanced skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group. (C3,P4)
3. Choose and organize audio video software and hardware in the conducive production environment with the latest and relevance information. (A3,LL)

Synopsis

This course is an extension from Multimedia System. It will give details and valuable insight of the wonderful world of digital audio and video. Throughout the semester, candidates will be introducing to topics on digital audio and video hardware, the art of audio production, recording techniques, video production, indoor and outdoor shooting procedure, implementing special effects, and storyboarding. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References

1. Mohd Hafiz Zakaria, Zulisman Maksom, Wan Sazli Nasaruddin Saifudin, and Mohd Haziq Lim Abdullah, in Press 2012. Digital Audio and Video Technology: Classroom in a book, Penerbit Universiti UTeM.

2. Mohd Haziq Lim Abdullah, Mohd Hafiz Zakaria, and Wan Sazli Nasaruddin Saifudin, 2010. Digital Audio

and Video Technology: Lab Module, Penerbit Universiti UTeM.

3. Ken C. Pohlmann, 2010. Principles of Digital Audio, Sixth Edition, McGraw-Hill Professional

4. Ananda Mitra, 2010. Digital Video: Moving Images and Computers, Facts on File Publishing

5. Adobe Creative Team, 2010. Adobe Premiere Pro CS5 Classroom in a Book, Adobe Press

DITM 3143 Digital Media Design (3, 2, 2)

Learning Outcomes

Upon completion of this course, the student should be able to:

1. Explain the concepts, techniques, basic desktop publishing production process, and graphic design theory.
2. To produce desktop publishing output by combining the use of text, color selection, layout objects, graphics, and image according to current needs.
3. Respond to the theory and applied skill in production design and layout of the interface and all areas of design, printing and publishing.

Synopsis

This course provides students with the concepts, techniques and desktop publishing process used in the industry. It emphasizes the use of text (typography), color selection, paragraph, objects, graphics and images composition. At the end of the course, students can master the principles in generating design cases and printing for desktop publishing by using the appropriate software and tools.

References

1. Susan Lake and Karen Bean, Digital Desktop Publishing, the Business of Technology, Div of Thomson Learning, 2007

2. Christopher Smith, Adobe Creative Team, Adobe InDesign CS5 Classroom in a Book, Adobe Press, 2010.

3. Aquent Creative Team, and AGI Creative Team, Illustrator CS4 Digital Classroom, John Wiley & Sons, 2009.

4. Jennifer Smith, Aquent Creative Team, and AGI Creative Team, Photoshop CS4 Digital Classroom, John Wiley & Sons, 2008.

5. Sandee Cohen, From Design into Print: Preparing Graphics and Text for Professional Printing, Peachpit Press, 2009.

DITM 3313 User Interface Design (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Understand and describe the definition and concept of user interface design components in interactive system.(C3, P3)
2. Apply problem solving skill by identifying and using design components in user interface design. (CTPS, P3)
3. Demonstrate lifelong learning by applying interaction design understanding in other related courses. (A3, LL)

Synopsis

This course is preparing the students with the knowledge about concepts and user interface design techniques. Students will be exposed to the user interface design processes for interactive

information system. This includes user scenario development, user object model, navigation model and components design.

References

1. Yvonne Rogers, Helen Sharp, Jenny Preece, Interaction Design: Beyond Human – Computer Interaction, 3rd Edition. Wiley, 2011.

2. Tania Schlatter, Deborah Levinson, Visual Usability: Principles and Practices for Designing Digital Application. Morgan Kaufman, 2013.

3. Sandee Cohen, From Design into Print: Preparing Graphics and Text for Professional Printing, Peachpit Press, 2009.

4. Interaction Design: Beyond Human-Computer Interaction. Third Edition. John Wiley and Sons, Ltd Publication. 2011.

5. Ben Shneiderman, Catherine Plaisant, Designing the User interface: Strategy for Effective Human-Computer Interaction, 5th Edition. Pearson, 2010.

DITM 3323 Introduction to Computer Games Programming (3, 2, 2)

Learning Outcomes

After completing this course, students will be able to:

1. Describe the basic concept related to 2D/3D game development based on the latest technology.
2. Identify skills, techniques and components for 2D/3D game development.
3. Relate and integrate the components that involved in producing a 2D application game which consists of various genres.

Synopsis

This course aims to equip the students with basic concepts and techniques in 2D game development. Student will be provide with some exposures on computer game theories, game design, and game logic. This includes teaching the students on how to develop game engine. Student will also expose related 2D game development such as 2D graphic integration and content development. At the end of the course, student will be able to develop simple 2D game based on the specified game genre.

References

1. Ernest Adams (2014), Fundamentals of Game Design (3rd Edition), New Riders, ISBN: 0-321-92967-5

2. Jeremy Gibson (2015), Introduction to Game Design, Prototyping, and Development. Addison-Wesley by Pearson. ISBN 0-321-93316-8

3. Steve Rabin (2010), Introduction to Game Development (2nd Edition), Cengage Learning, ISBN: 1584506792.

4. Andy Harris (2007), Game Programming: The L Line, The Express Line to Learning, John Wiley & Sons, 2011. ISBN: 1118085450

5. Roger Pedersen, Game Design Foundations, Jones & Bartlett Publishers.ISBN 1449663923

DITS 3613 Basic Networking (3, 2, 2)

Learning Outcomes

At the end of the course, students should be able to:

1. Apply mathematics, terminology, and the network model to solve problems. (C3)
2. Propose the network specifications and functions when appropriate in accordance with the requirements.(A3, LL2)

3. Build local area networks using Cisco routers (P3,CTPS2)

Synopsis

This subject is the beginning of the course of four preparatory course towards professional certification CCNA. DITS3613 introduce students to the field of networking. This course focuses on network terminology, network protocol, local area networks, wide area networks, open - system model of the connection, cabling, cabling tools, routing, routing programming, technology, Ethernet, Internet protocol addressing and network standards.

References

1. Mark A.Dye, Allan D. Reid. (2013), "Introduction to Networking Companion Guide", Cisco Press.

2. Erman Hamid, Nazrulazhar Bahaman, Mohd Fairuz Iskandar Othman, BASIC NETWORKING (2008)

3. "Networking Basic, Practical Approach", Venton. (2013), " Introduction to Networks v5.0 Lab Manual (Lab Companion)", 1st Edition", Cisco Press

4. Anthony Sequeira, John Tiso (2013). "Cisco CCNA Routing and Switching 200 - 120 Foundation Learning Guide Library, Cisco Press.

DITS 3623 Network Routing (3, 2, 2)

Learning Outcomes

Upon successful completion of this subject, the students should be able to:

1. Explain the critical role routers play in enabling communications across multiple networks.(A3)
2. Configure and verify networking by applying static and dynamic routing (P3, CTPS)
3. Apply and implement suitable routing with a classless IP addressing scheme. (C3, CTPS, LL)

Synopsis

This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. By the end of this course, students will be able to recognize and correct common routing issues and problems. Students complete a basic procedural lab, followed by basic configuration, implementation, and troubleshooting labs in each chapter.

References

1. Graziani, R. & Johnson, A. (2007) *Routing Protocols and Concepts, CCNA Exploration Companion Guide)*, 1st Edition, Cisco Press

2. Mat Ariff, N.A. Bahaman, N. Wan Ghazali, K. Hamid, E (2008) *Routing Fundamental: Practical Approach*, Venton.

3. Online notes, *CCNA 2 Exploration http://cisco.netacad.net*

4. Johnson, A. (2007) *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide*, 1st Edition, Cisco Press

5. Velte, T. J. & Velte, A.T. (2007). *Cisco A Beginner's Guide.* 4th Edition. McGraw Hill.

DITS 3633 Implementing and Administering Active Directory (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the term, concept, and the usage of Directory Services in various sources (C2,P1,A3,LL)
2. Apply the installation, configuration and management of Active Directory features (C3, P3, LL, CTPS)

3. Select and demonstrate Active Directory administration through the use of security features, group policy and software deployment tools (C3, P3, A3, LL, CTPS)

Synopsis

This course teaches the student on how to implement and configure Active Directory. Besides, it guides to manage name resolution, schema and replication. The purpose of active directory usage is to manage users, groups, shared folder and network resource, and to administer the user environment and software with group policy. It also will cover monitoring and optimizing Active Directory.

References

1. Dan Holme, Nelson Ruest, Danielle Ruest, Jason Kellington: Self-Paced Training Kit (Exam 70-640): Configuring Windows Server 2008 Active Directory, Microsoft Press; Second Edition 2011.

2. John Policelli: Active Directory Domain Services 2008 How-To, Sams Publishing; 1Edition 2009.

3. Brian Svidergol, Robbie Allen: Active Directory Cookbook, O'Reilly Media 4th Edition 2013.

4. John Policelli: Active Directory Domain Services 2008 How-To, Sams Publishing 2009.

DITS 3643 Implementing and Administering Network Infrastructure (3, 2, 2)

Learning Outcomes

By the end of this subject, the student will be able to:

1. Describe the term, concept and goals for network infrastructure.(C1)
2. Explain the network environment using network infrastructure elements.(A3)
3. Demonstrate the installing, configuring, monitoring, optimizing server and managing network infrastructure.(P4, LL, CTPS)

Synopsis

The course teaches the student how to install and configure Microsoft Windows 2008 server. Student will learn how to install the Windows 2008 Server through standard installation routines. Inside the server environment, student will learn various file system and disk management function. This course will explain the elements of the network infrastructure such as intranet, remote access, remote office, internet and extranet. Student should able to configuring and managing network infrastructures such as DHCP, DNS, WINS, and FTP.

References

1. Microsoft : "Windows Server 2008 Inside Out", William R. Stanek

2. Mc Graw Hill : "Microsot Windows Server 2008 A Beginner's Guide", Marty Matthews

3. Microsoft : "Windows Server 2008 Administrator's Pocket Consultant", William R. Stanek

4. Network+ Guide to Network (4th Edition), Tamara Dean

DITI 3113 Artificial Intelligence (3, 2, 2)

Learning Outcomes

Upon completion this course, students will be able to:

1. Define the basics of Artificial Intelligence. (C1, LL1)
2. Describe the components of Artificial Intelligence techniques. (C2, P1)
3. Follow the Artificial Intelligence techniques in problem solving. (P3, A1, CS4, TS1)

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References

1. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
2. Russel, S & Norvig, P. (2009). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall
3. Luger, G. F. (2009). Artificial Intelligence: A Guide to Intelli gent System, 3rd Edition, Addison Wesley.
4. Ertal, W. (2011). Introduction to Artificial Intelligence, Springer.
5. Kopec, D., Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

DITI 3123 Logic Programming (3, 2, 2)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Use the elements and concepts of logic and procedural programming,
2. Reproduce the Prolog algorithm for solving logic programming problems,
3. Construct basic programs using logic programming structures.

Synopsis

Students are exposed to the basic of logic programming which include the syntax and semantics of Prolog software. Elements such as predicate logic, rules, queries, recursive rule, controlling backtracking, unification and input output are the main concern while conducting this course. This course use Prolog software to develop a simple computer solution of some AI applications such as problem solving, and expert systems.

References

1. Ivan Bratko (2012), Prolog Programming For Artificial Intelligence, Addison Wesley
2. Max Bramer, Johan Bos and Kristina Striegnitz, (2013), Logic Programming with Prolog, Springer.
3. Randall Scott, (2010), A Guide to Artificial Intelligence with Visual Prolog, Outskirts Press.
4. Richard O'Keefee (2009). The Craft of Prolog. The MIT Press.
5. Saroj Kaushik (2007), Logic And Prolog Programming, New Age International.

DITI 3513 Artificial Intelligence in Robotics & Automation (3, 2, 2)

Learning Outcomes

Upon completing this subject, the student should be able to:

1. Analyze fundamental concepts related to robotic. (C3) Organize solution steps in solving robot IC manipulator's dynamic equations. (A3, CTPS, CS)
2. Construct robotic programming for human function simulation. (P3)

Synopsis

This course covers introduction of robotics, which includes mechanical structure of robot systems, mechanics of robot manipulators and control systems. The students also will be exposed to the principles of automation and robotic programming, which are employed in the derivation of the principles of robot dynamics.

References

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